

SITE SAFETY BRIEFINGS

Job Name _____ Number _____

Date _____ Start Time _____ Completed _____

Site Location _____

Type of Work (General) _____

SAFETY ISSUES

Tasks (this shift) _____

Protective Clothing/Equipment _____

Chemical Hazards _____

Physical Hazards _____

Control Methods _____

Special Equipment/Techniques _____

Nearest Phone _____

Hospital Name/Address _____

Special Topics (incidents, actions taken, etc.) _____

ATTENDEES

Print Name

Sign Name

Meeting conducted by: _____

PLAN ACCEPTANCE

INSTRUCTIONS: This form is to be completed by each Dames & Moore employee to work on the subject project work site and returned to the Office Safety Coordinator prior to site activities.

Project No.: _____

Client/Project: _____

Date: _____

I represent that I have read and understand the contents of the above Plan and agree to perform my work in accordance with it.

Signed

Signed

Print Name

Print Name

Date

Date

Signed

Signed

Print Name

Print Name

Date

Date



DAMES & MOORE

SUPERVISOR'S REPORT OF INJURY OR ILLNESS

To be completed in addition to the "Employer's First Report of Occupation Injury or Illness"

Date/time of incident _____

Project name _____

Job Number _____

CASE NUMBER _____

For office use only

Describe exact location of incident _____

What was employee doing when injured? _____

Describe fully how incident occurred _____

What object or substance directly injured the employee? _____

Who was involved in the incident? (D&M employees)

Name _____

Name _____

Name _____

Employee No. _____

Employee No. _____

Employee No. _____

Any non-D&M employees involved or injured? ☐ No ☐ Yes (if yes, complete next section. Use additional paper if necessary.)

Name _____

Name _____

Company _____

Company _____

Were there any witnesses to the accident? ☐ No ☐ Yes (if yes, complete next section. Use additional paper if necessary.)

Name _____

Name _____

Employee No. _____

Employee No. _____

Who was hospitalized? _____

Who saw a physician? _____

Name of hospital(s) and physician(s) involved? _____

Pending investigation, were any steps taken to prevent reoccurrence? _____

Supervisor's name _____

Signature _____

ADDITIONAL INFORMATION

The Supervisor's Report of Injury or Illness is to be completed by the affected employee's direct supervisor. The supervisor is responsible for obtaining the requested information and making a reasonable effort to complete all sections of the form to the extent possible.

This report is one of a minimum of three that must be completed and/or obtained for distribution. The other reports are the Employer's First Report of Employee Injury or Illness (or equivalent Worker's Compensation form for the particular state) and the Doctor's Report of Occupational Injury or Illness (or equivalent).

Distribution of these forms is as follows:

Rosemary Reisman - EXO (Risk Management)
John Danby - SAC (ASHA Recordkeeping)
Dames & Moore's Worker Compensation Administrator for your state
Employee's file

Bureau of Labor Statistics
Supplementary Record of
Occupational Injuries and Illness

U.S. Department of Labor

This form is required by Public Law 91-586 and must be kept in the establishment for 5 years.
Failure to maintain can result in the issuance of citations and assessment of penalties.

Case or
file No.

Form Approved
O.M.B. No. 1220-0029

Employer

1. Name

2. Mail address (No. and street, city or town, State, and zip code)

3. Location, if different from mail address

Injured or Ill Employee

4. Name (First, middle, last)

Social Security No. | | | | | | | |

5. Home address (No. and street, city or town, State, and zip code)

6. Age

7. Sex (Circle one)

Male

Female

8. Occupation (Enter regular job title, not the specific activity he was performing at time of injury.)

9. Department (Enter name of department in which the injured person is regularly employed, even though he may have been temporarily working in another department at the time of injury)

The Accident or Exposure to Occupational Illness

accident or exposure occurred on employer's premises, give address of plant or establishment in which it occurred. Do not indicate department or division within the plant or establishment. If accident occurred outside employer's premises at an identifiable address, give that address. If it occurred on a public highway or at any other place which cannot be identified by number and street, please provide place references locating the place of injury as accurately as possible.

10. Place of accident or exposure (No. and street, city or town, State, and zip code)

11. Was place of accident or exposure on employer's premises?

Yes

No

12. What was the employee doing when injured? (Be specific. If he was using tools or equipment or handling material, name them and all what he was doing with them)

13. How did the accident occur? (Describe fully the events which resulted in the injury or occupational illness. Tell what happened and how it happened. Name any objects or substances involved and how they were involved. Give full details on all factors which led or contributed to the accident. (Use separate sheet.)

Occupational Injury or Occupational Illness

14. Describe the injury or illness in detail and indicate the part of the body affected. (E.g., amputation of the right index finger at the second joint; fracture of ribs; lead poisoning; dermatitis of left hand, etc.)

15. Name the object or substance which directly injured the employee. (For example, the machine or thing he struck against or which struck him; the vapor or poison he inhaled or swallowed; the chemical or radiation which irritated his skin; or in cases of strains, hernias, the thing he was lifting, pulling, etc.)

Physician

16. Date of injury or initial diagnosis of occupational illness

17. Did employee die? (Circle one)

Yes

No

Name and address of physician

18. If hospitalized, name and address of hospital

Date of Report

Prepared By

Official Position

DAILY INSTRUMENT CALIBRATION CHECK SHEET

Instrument: _____

Serial # _____

[illegible]

AIR MONITORING

GENERAL INFORMATION

Name(s): _____ Background Level: _____
Date: _____ Weather Conditions: _____
Time: _____
Project: _____
Job No.: _____
Estimated Wind Direction: _____
Estimated Wind Speed (i.e., calm, moderate, strong, etc.): _____
Estimated Air Temperature and % Relative Humidity: _____
Location Where Background Level Was Obtained: _____

EQUIPMENT SETTINGS

Range: _____ Alarm Trigger-%LEL: _____
Span Pot: _____ Alarm Trigger-%O2: _____
Calibration Gas: _____ Calibration Gas: _____

FIELD ACTIVITIES

Field Activities Conducted: _____

BACKGROUND LEVEL: _____ LOCATION: _____

Sample No.	Time	Duration (Minutes)	Location	Reading (ppm)	Comments
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

SUBCONTRACTOR STATEMENT OF COMPLIANCE

This document is designed to permit the Dames & Moore Project Manager to evaluate a subcontractor's compliance with the health and safety aspects of the subcontractor agreement. The Project Manager completes the top portion of this document, and provides a copy of the document to each subcontractor who will be participating in project field activities. The subcontractor completes the second portion of the document, signs it, and returns it to the Dames & Moore Project Manager prior to the start of work.

Project Name/Location _____
Job Number _____
Project Manager/Location _____
Subcontractor _____
Tasks _____
Project Dates _____ through _____

SUBCONTRACTOR

Subcontractor certifies that all its personnel assigned to this project have received 40-hour health and safety training per the requirements of 29 CFR 1910.120(e)

Subcontractor Initials

Subcontractor certifies that its field supervisor has completed 8 hours of supervisor training that meets the requirements of 29 CFR 1910.120(e)(4).

Field Supervisor's Name (Print)

Subcontractor Initials

Subcontractor certifies that all of its personnel assigned to this project are participating in a medical surveillance program that meets the requirements of 29 CFR 1910.120(f).

Subcontractor Initials

Subcontractor understands that it is responsible for providing a site-specific health and safety plan for this project that meets the requirements of 29 CFR 1910.120(b).

Subcontractor Initials

Subcontractor initials here if it will provide its own health and safety plan (Dames & Moore will provide OSHA-requested site-specific information).

Subcontractor Initials

OR

Subcontractor initials here if requesting Dames & Moore to prepare health and safety plan for subcontractor's use.

Subcontractor Initials

Subcontractor's Representative (Print)

Signature

EMPLOYEE EXPOSURE HISTORY

Employee Name: _____

Job Name: _____

Job Number: _____

Date(s) From/To: _____

Hours on Site: _____

Contaminants (Suspected/Reported):

[illegible]

(See Attached Laboratory Analysis)

BLOODBORNE PATHOGENS INCIDENT EVALUATION REPORT

Employee Name: _____
Office/Location: _____
Incident Date: _____ Incident Time: _____ a.m./p.m.

Did the employee render First Aid or CPR with blood or other potentially infectious materials present: ☐

Did an exposure incident occur? ☐ If yes, describe here and complete the following section.

Circumstances: Supervisor's assessment of the following control measures used at the time of the exposure (see definitions below):

Route of Exposure: _____

Engineering: _____

Work Practice: _____

Personal Protective Equipment: _____

Reason for failures of the control measures or failure to comply with recommended protective measures:

Measure taken to minimize the reoccurrence of exposure incident: _____

Supervisor's Signature: _____

Definitions:

Exposure Incident means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

Engineering Control means controls (e.g., sharps, disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.

Work Practice Controls means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique.)

Personal Protective Equipment is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes not intended to function as protection against a hazard are *not* considered to be personal protective equipment.

Routing Requirements: Medical Surveillance Program Manager - DEN
Division Health and Safety Manager

EMERGENCY RESPONSE CHECKLIST

In an Emergency	Yes	No
Confirm the reported incident	<input type="checkbox"/>	<input type="checkbox"/>
Evacuate and secure the area	<input type="checkbox"/>	<input type="checkbox"/>
Render first aid/emergency medical care	<input type="checkbox"/>	<input type="checkbox"/>
Notify promptly:		
Project Manager	<input type="checkbox"/>	<input type="checkbox"/>
Fire Department	<input type="checkbox"/>	<input type="checkbox"/>
Police Department	<input type="checkbox"/>	<input type="checkbox"/>
Nearest Hospital or Medical Care Facility	<input type="checkbox"/>	<input type="checkbox"/>
Start Documentation	<input type="checkbox"/>	<input type="checkbox"/>
If a spill or leak occurs:		
Don the proper PPE	<input type="checkbox"/>	<input type="checkbox"/>
Stop the source	<input type="checkbox"/>	<input type="checkbox"/>
Contain the spill	<input type="checkbox"/>	<input type="checkbox"/>
Clean up the spill	<input type="checkbox"/>	<input type="checkbox"/>
Upon evacuating, take attendance at the assembly area	<input type="checkbox"/>	<input type="checkbox"/>
Authority given:		
Leave the site	<input type="checkbox"/>	<input type="checkbox"/>
Restart the operations	<input type="checkbox"/>	<input type="checkbox"/>
Debrief and document the incident	<input type="checkbox"/>	<input type="checkbox"/>
A copy of the document submitted to the DHSM	<input type="checkbox"/>	<input type="checkbox"/>



DAMES & MOORE

A DAMES & MOORE GROUP COMPANY

WORK PLAN (REVISION 1.0)

INSTALLATION OF BEDROCK
MONITORING WELLS

AIRCO PROPERTIES, INC. SITE
NIAGARA, NEW YORK

Prepared for:
THE BOC GROUP, INC.

JOB NO: 24268-009-120
APRIL 10, 1997

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WORK PLAN
(REVISION 1.0)
INSTALLATION OF BEDROCK MONITORING WELLS
AIRCO PROPERTIES, INC. SITE
NIAGARA, NEW YORK

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WORK PLAN
(REVISION 1.0)
INSTALLATION OF BEDROCK MONITORING WELLS
AIRCO PROPERTIES, INC. SITE
NIAGARA, NEW YORK

1.0 INTRODUCTION

This document presents the work plan for installation of four bedrock monitoring wells at the Airco Properties, Inc. (Airco) property in Niagara, New York. The purpose of this document is to describe the procedures for installation of four bedrock monitoring wells and the sampling and analysis of groundwater samples to further characterize hydrogeologic conditions at the site.

The objective of the bedrock monitoring well installation and sampling program is to obtain additional hydrogeologic data for:

- Characterization of the on-site bedrock groundwater quality;
- Evaluation of the on-site bedrock groundwater flow direction; and,
- Use in evaluating the potential presence of a bedrock groundwater flow divide on-site.

Section 2.0 presents a review of the history and background of the site. Section 3.0 presents a review of the regulatory history of the Airco property. Section 4.0 presents an overview of site geologic and hydrogeologic conditions. The scope of work for the installation of the bedrock monitoring wells and the collection and analysis of groundwater samples is presented in Section 5.0. Section 6.0 presents a discussion of the project organization, schedule, and routine reporting to be followed for the investigation activities. A discussion of the Health and Safety Plan for the project is presented in Section 7.0. Section 8.0 presents a discussion of the investigation report to be completed for the project. A Citizen Participation Plan is presented in Section 9.0.

2.0 BACKGROUND

The Airco property is situated on the east side of Witmer Road in the Town of Niagara, Niagara County, New York, as shown in Figure 1. The site is located on the eastern edge of a heavily urbanized area, constituting the City of Niagara Falls.

The Airco property is an approximately 25-acre site that was formerly part of a larger property owned by the Vanadium Corporation of America (Vanadium). The larger property was reportedly used by Vanadium for the disposal of a variety of industrial materials, including wood, brick, ash, stainless steel lime slag, ferrochrome silicon slag, and ferrochrome silicon dust. In 1964, an approximately 62-acre

portion of the Vanadium property was sold to Airco for use by its Airco Alloys Division. At the time of sale, virtually all of the slag stored on the property was sold to an independent contractor and removed from the site. From approximately 1964 through 1971, Airco utilized the property for the disposal of materials similar to those previously disposed by Vanadium. In 1971, Airco initiated the disposal of slurried baghouse dusts from its operation at the site. Between 1971 and 1979, Airco reportedly disposed of up to 5,600 tons per year of slurried ferrochrome silicon dust and unknown quantities of other ferroalloy production slags and dusts. From 1976 through 1979, Airco reportedly also placed an additional 8,000 tons per year of slurried ferrosilicon dusts on its property.

In 1979, Airco sold its Airco Alloys Division to SKW Alloys, Inc. As part of the sale, Airco subdivided the property and transferred a 37-acre parcel (located on the western portion of the property) to SKW Alloys, Inc. This action left Airco with an approximately 25-acre parcel (Airco property). Subsequent to the sale, from approximately 1979 through 1981, no additional materials were disposed on the Airco property.

In approximately 1981, the Airco Carbon Division of Airco permitted the site as a non-hazardous solid industrial waste landfill under Title 6 New York State Codes, Rules, and Regulations, Part 360 (6 NYCRR Part 360). The landfill was to be developed and closed in a sequential manner. From approximately 1981 through 1988, the Airco property was used for the disposal of inert fire bricks, concrete blocks, coke, and graphite waste generated from the Airco Carbon Division's carbide and graphite production operations.

In 1988, waste disposal at the site was discontinued following the sale of Airco Carbon Division's Niagara Falls production facility, but not the landfill property, to The Carbide/Graphite Group. The landfill permit subsequently expired. In 1990, The Carbide/Graphite Group attempted to renew the landfill operating permit, but was unsuccessful. Thus, since 1988, no disposal has occurred and site activities have consisted predominantly of surface water and groundwater monitoring performed in accordance with the conditions of the previously issued landfill permit.

3.0 REGULATORY HISTORY

As previously discussed, the 25-acre Airco property occupies a portion of a larger property historically owned by Vanadium. The Airco property is situated in the center of an approximately 115-acre area that has been listed by the New York State Department of Environmental Conservation (NYSDEC) in the New York State Registry of Inactive Hazardous Waste Sites. The site is referred to as the Vanadium Corporation of America site (NYSDEC Site No. 932001), and originally was listed as a "Class 3" site under 6 NYCRR Part 375 (Note: the site was originally referred to as the SKW Alloys, Inc. site). The Vanadium Site includes the 37-acre property owned by SKW Alloys (to the west), the 25-acre property owned by Airco (in the center), and a 53-acre site reportedly owned by the Power Authority for the State of New York (PASNY) and the Niagara Mohawk Corporation (NiMo) (to the east).

In March 1995, based in part on a Preliminary Site Assessment of the Vanadium site completed by ABB Environmental Services, Inc., the NYSDEC reclassified the Vanadium site as a "Class 2" site under 6 NYCRR Part 375. Since this time, the NYSDEC has negotiated with various parties in an effort to implement a Remedial Investigation/Feasibility Study (RI/FS) for the entire Vanadium site. NYSDEC has also reportedly implemented an Immediate Investigation Work Assignment on the PASNY/NiMo property during the last year.

NYSDEC and Airco are currently negotiating a consent agreement to establish the framework for further investigation and assessment of the Airco property. The investigations described herein are intended to further the understanding of site-specific hydrogeologic conditions, especially as they pertain to the upper portion of the bedrock aquifer at the Airco property.

4.0 SITE CONDITIONS

A considerable amount of site investigation work has been completed for the Vanadium site and the Airco property over the last 20 years. Investigations of the Airco property have included studies for the permitting of the solid waste landfill, and completion of quarterly groundwater and surface water monitoring since 1979. Investigations of groundwater and surface water have also been completed for adjacent sites including the SKW property, NYSPA/NiMo property, and the nearby Union Carbide property.

The following sections present a discussion of the site topography, surface drainage and geologic and hydrogeologic conditions of the Airco property based on previously completed investigations of the site and adjacent sites.

SITE TOPOGRAPHY AND DRAINAGE

The Airco property is located east of the lower Niagara River in northern New York at an elevation of approximately 610 feet above mean seal level (msl). The Niagara Reservoir is approximately 1-mile north of the site at an elevation of approximately 635 ft msl. The lower Niagara River is 1.5 miles west and 300 feet below the site. Gill Creek is approximately 1/2-mile east of the site and flows south towards the upper Niagara River.

The Airco property is characterized by small irregular hills and mounds and a capped landfill area. Site surface water drains towards two intermittent streams, located east and west of the landfill, that join at the southwest corner of the site. The streams, which are dry during periods of reduced precipitation (summer months), discharge into a marshy area south of the site.

GEOLOGY/HYDROGEOLOGY

The geology beneath the site consists of fill material, underlain by unconsolidated glacial and lake deposits which overlie dolomite bedrock. Previous site investigations indicate that industrial waste and fill covers the site and is generally 1 to 10 feet thick. The fill is underlain by native unconsolidated lacustrine sediments. This sediment consists of low permeability lacustrine silty-clay and clayey-silt deposited by proglacial lakes and range in thickness from 4 to 10 feet. Below the lacustrine deposits is a more permeable layer of silts and fine sands approximately 2 to 12 feet thick, underlain by a dense glacial till ranging from 1 to 7 ft thick. Underlying the unconsolidated material is the Lockport dolomite bedrock, which is generally located 15 to 25 feet below the site surface.

Groundwater beneath the site is present in three zones: two in the overburden and one in the bedrock. Previous site studies indicate that a temporal, perched water table exists in the fill material located above the native lacustrine deposits. The perched water table is comprised of surface water which has infiltrated the fill material and cannot readily pass through the underlying lacustrine deposits. A second water bearing zone is located in the sand and sandy silt layer located above the glacial till and underlying bedrock. Hydrogeological studies of the site area indicate that these two groundwater bearing zones may not be hydraulically connected.

Groundwater in the bedrock has generally been reported to exist in three features: bedding planes, vertical fractures, and small solution cavities. Although all three formation features contain groundwater, the bedding planes are reported to provide the primary mechanism for groundwater transport within the Lockport dolomite bedrock. Based on past investigations on the Lockport dolomite formation in the Niagara County area, groundwater has been identified in two distinct features: in the upper 10 to 15 feet of weathered bedrock rock and in seven lower permeable zones. The upper weathered zone at the top of the dolomite formation is moderately permeable and is characterized by bedding lanes and vertical fracture joints which have been widened by dissolution of the dolomite and gypsum present in the formation. Regionally, this weathered bedrock zone is the predominant bedrock water bearing zone and it may contain either water table or artesian conditions. The remaining seven water bearing zones act as separate and distinct artesian aquifers and are reportedly recharged at the outcrop of the individual zones at the overburden/bedrock interface.

A previous United States Geological Survey (USGS) study indicated that groundwater in portions of the Niagara Falls area is influenced by the NYSPA Power Project. The Power Project uses two 4-mile long buried conduits to supply water for two power plants located approximately 2-miles north of the site. The conduits, which measure 44-feet wide by 66-feet high and are buried more than 100 feet into the bedrock, are located beneath the NYSPA/NiMo site to the east of the Airco site. A 1987 USGS study indicated that bedrock groundwater within 1/2-mile of the buried conduits may be influenced by the drainage system that surrounds the conduits. Since the Airco property is located approximately 1/4-mile west of the conduits, it is possible that the conduits may affect bedrock groundwater conditions at the site.

5.0 SAMPLING AND ANALYSIS PLAN

To improve the understanding of site specific hydrogeologic conditions, especially the uppermost bedrock aquifer, a total of four bedrock monitoring wells will be installed on the Airco property. These wells will be installed on-site at the location of the four existing overburden monitoring well pairs (MW-1/1a, MW-2/2a, MW-4/4a, and MW-13/13a). Figure 2 illustrates the location of the new well locations relative to existing monitoring well locations and site features.

The bedrock monitoring wells will be installed in the Lockport dolomite bedrock beneath the site. These wells will be constructed in general accordance with NYSDEC and the U.S. Environmental Protection Agency's (USEPA's) Technical Enforcement Guidance Document guidelines. A detailed discussion of monitoring well installation and development is presented in Section 5.1 - Monitoring Well Installation.

Following installation and development, groundwater samples will be collected from each of the four bedrock wells for laboratory analysis. Detailed procedures for the purging and collection of groundwater samples from the monitoring wells are presented within Section 5.2 - Groundwater Sampling. The groundwater samples will be analyzed in accordance with the program outlined in Section 5.3 - Analytical Program.

The following sections present the procedures to be used to complete the field investigation including the installation of the bedrock monitoring wells, collection of groundwater samples for laboratory analysis, and other procedures that will be used to provide quality control and maintain data integrity.

5.1 MONITORING WELL INSTALLATION

Borings for the installation of groundwater monitoring wells will be completed using hollow-stem auger and rotary drilling techniques. The wells will be completed with PVC casings through the overburden materials and open-hole construction into bedrock. It is anticipated that the new wells will be installed to a depth of approximately 30 feet below grade.

Borings for the monitoring wells will be advanced to the depth of bedrock (estimated at approximately 15 to 18 feet below grade at the well locations) using continuous flight hollow-stem augers. During drilling of overburden materials, samples of the subsurface materials will be retrieved at 5-foot intervals using 2-inch diameter, 2-foot long split-spoon samplers. Soil samples will be collected using split-spoon samplers in accordance with ASTM D 1586-84: *Standard for Penetration Test and Split-Barrel Sampling of Soils*. A representative portion of each collected sample will be retained for description and archival purposes. A rock socket for the PVC casing will be drilled 5 feet into bedrock by drilling through the hollow-stem augers using a roller cone bit and air rotary drilling techniques. Borings and well completion details will be logged in the field by a supervising hydrogeologist.

5.1.1 WELL CONSTRUCTION

Each new bedrock monitoring well will have the same basic construction, differing only in the depth of the overburden casing and total well depth. Figure 3 presents a diagram of the well completion details. The bedrock wells will be constructed with 4-inch diameter, schedule 80, threaded, flush joint PVC casing installed through the overburden and 5 feet into bedrock. The PVC casing will be grouted in place to seal the borehole from overburden water zones. Once the grout has cured for at least 24 hours, an approximate 3 $\frac{7}{8}$ -inch diameter borehole will be advanced through the casing an additional 10 feet by coring with an HQ rock core bit.

The grout seal for the PVC casing will consist of a cement/bentonite grout containing 5 percent bentonite and consisting of not more than seven gallons of potable water per cubic foot (94 lbs) of Portland cement.

Wells will be protected at the surface with a lockable 6-inch diameter steel casing set in a concrete pad which is sloped to allow drainage of precipitation or runoff away from the well. Concrete pads will be constructed of 6-inch thick reinforced concrete, 2-feet by 2-feet square. Provision will be made for draining the inside of the protective casing, and the well casing itself will be capped with a vented cap. All wells will be conspicuously painted or flagged and marked in a permanent manner with the well number. Following well completion, the well locations, riser, and ground surface elevations will be surveyed. The elevations will be surveyed to within 0.01 foot relative to an established site benchmark.

5.1.2 WELL DEVELOPMENT

All wells will be developed by pumping and/or surging and bailing until the water being removed from the well is clear, and free of sediment, with a turbidity of less than 50 NTUs. Each well will be developed for not less than one hour. During well development pH, conductivity, temperature, and turbidity will be periodically measured. If after one hour it is apparent that the desired clarity will not be achieved, well development will continue until indicator parameters of pH, conductivity and temperature have stabilized over two successive well volumes or until approved by a qualified hydrogeologist as best obtainable. These measurements will be recorded on the well development record or noted in a controlled field notebook.

5.1.3 DECONTAMINATION

Drilling and sampling methods and equipment have been chosen to minimize decontamination requirements and the possibility of cross contamination. Prior to initiation of drilling activities and between each boring/well location, all drilling equipment (including augers, drill rods, and other down-hole equipment) will be steam cleaned using a high pressure wash. Any non-dedicated sample tubing, rope, rods, etc., will be disposed of after sampling. All reusable sampling tools and equipment, such as split-spoon samplers, will be decontaminated as follows:

- Clean with a non-phosphate detergent (such as Alconox) using a brush to remove particulate matter and surface films;
- Rinse thoroughly with tap water or deionized water;
- Visually inspect for cleanliness and repeat detergent wash, if necessary;
- Triple rinse with deionized water.

The exterior surface of all other sampling and testing equipment (pH meter, conductivity meter, and groundwater elevation measuring device) will be decontaminated by washing with a non-phosphate detergent solution followed by a deionized water rinse. A second washing with nitric acid solution (non-metallic equipment only) will be followed by a final triple rinse with deionized water. Water produced during well development activities will be allowed to discharge to the ground surface.

5.2 GROUNDWATER SAMPLING

Following installation and development, representative groundwater samples will be collected from each of the four bedrock wells for laboratory analysis. The analytical program for collected groundwater samples is presented in Section 5.3 - Analytical Program.

Groundwater sampling consists of calculating the volume of static water in the well, evacuation of static water from the wells, and the collection of groundwater samples. The procedures and protocols that will be used for the collection of groundwater samples are described below.

5.2.1 WATER LEVEL MEASUREMENT

Prior to purging, the depth to water and total well depth will be measured to determine the volume of standing water in each well. Depth to water measurements will be made using an electric water level indicator. All groundwater level measurements and total well depth measurements will be made in reference to an established reference point on the well casing. The referenced elevation, the measured water level, and the total well depth will be documented in the field records. Depth to water measurements are needed to calculate the groundwater elevation and total well depth measurements are necessary to determine the volume of water standing in the well casing prior to purging the well.

5.2.2 WELL PURGING

Purging and sampling will be performed using a submersible pump or disposable, pre-cleaned reusable, or dedicated bailers. All sampling and purging equipment will be decontaminated before initial use and between each well location using the procedures outlined in Section 5.1.3 - Decontamination. During

purging, pH, conductivity, temperature, and turbidity will be periodically measured. A minimum of three well volumes (or until dry) will be purged from each well to remove stagnant water standing in the well casing. In addition, stabilization of temperature (± 0.5 C), pH (± 0.1 pH unit), and conductivity (± 10 percent) over at least three consecutive measurements will be observed prior to sampling each well. Field measurement of temperature, pH, and conductivity for water samples collected at the site will be made using a Hydac combination meter equipped with a pH probe, or equivalent. Because pH is a temperature dependent parameter, the pH of groundwater samples will also be measured in the laboratory at 25°C.

Because of the potential for groundwater to have a high pH of up to 12.5 and the importance of recording accurate field measurements, a procedure for pH meter calibration is provided. This procedure follows the guidance that is provided in USEPA's *Methods for Analysis of Water and Wastes* (EPA 600/4-79-020, March 1979) Method 150.1.

The pH meter will be calibrated with standard buffer solutions before being used in the field. In the field, the meter will be calibrated daily with two buffer solutions before use. The range of the buffer solution will be at least three or more pH units apart and will bracket the expected pH (to a maximum of 12.5) of the sample being measured. Buffer solutions of 4.0, 7.0, 10.0, and 12.5 pH units will be available in the field for calibration purposes.

- Measure the temperature of the buffer solution.
- Connect the pH electrode into the pH meter and turn on pH meter.
- Set temperature setting based on the temperature of buffer; place electrode in the first buffer solution.
- After reading has stabilized, adjust "ZERO" knob to display correct value.
- Repeat procedure for second buffer solution, adjust "SLOPE" knob to display the correct value.
- Repeat two point calibration described above to verify calibration.
- Place pH electrode in the sample and record the pH as displayed.
- Remove pH electrode from sample and rinse off with distilled water.
- Recalibrate the pH meter every time it is turned off and turned back on, or if the measured pH of the collected water sample is not within the calibration range of the instrument.

- Because buffer solution standards above 12.5 pH units are not readily available for use in the field, pH of measurements above 12.5 should be noted as "out of instrument calibration range".

Calibration procedures for other field instrumentation, such as conductivity meters, thermometers, and turbidity meters, will be completed in accordance with standard procedures and equipment manufacture recommendations. Equipment calibration procedures and notes documenting completed field calibration of the equipment will be recorded on field sampling records for each days sampling event.

5.2.3 SAMPLE COLLECTION

Immediately after purging is completed, samples will be collected using a disposable, pre-cleaned, reusable or dedicated bailer. Pre-cleaned, laboratory supplied sample bottles will be filled directly from the sampling device at each well. Samples for both total and dissolved fraction metals analysis will be collected at each well. Samples to be analyzed for dissolved metals fraction will be field filtered through disposable 0.45 μm high capacity filters using a peristaltic pump and disposable tubing to transfer water from a transfer cup to the sample bottle. The transfer cup, filter, and tubing will be discarded after each use. Samples for remaining parameters will be transferred directly from the bailer into the appropriate sample bottles. Table 1 presents appropriate sample container types, volumes and preservatives for applicable parameters.

Immediately following sample collection, the containers will be stored in sample holders provided by the laboratory. The samples will be kept cool by being packed with ice or "blue ice" packs. Before shipment, the containers will be securely packed with a packing material such as bubble-wrap. The coolers will be shipped via overnight courier or personally delivered to the laboratory under chain-of-custody procedures. All samples will be shipped no latter than the day following sample collection.

5.2.4 SAMPLE CHAIN-OF-CUSTODY

A chain-of-custody form will accompany the samples from the field to the laboratory. The chain-of-custody form will trace the path of each individual sample by means of a unique identification number.

The project manager will notify the laboratory of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped, as well as the anticipated date of arrival. Sample shipping containers will be provided by the laboratory. Upon receipt from the laboratory, sampling personnel will check each shipping container for integrity of its seals. Any container with a broken seal will not be used.

Once the sample containers are filled and appropriately preserved and tagged, they will be immediately placed in the shipping containers to maintain the samples at approximately 4°C. Field personnel will indicate the sample designation/location number in the space provide on the appropriate chain-of-custody

form for each sample. The chain-of-custody forms will be signed and placed in the shipping container. Each container will be secured by use of a custody seal affixed to the outside of the container, and will be delivered to a courier service for transport, or personally transported to the laboratory.

Receipt, storage, and tracking of samples submitted to the laboratory are conducted according to strict protocol to prevent sample contamination or loss, as well as the production of invalid laboratory data as a result of sample deterioration or tampering. Upon receipt at the laboratory, samples are checked in by means of sample management system. This system retains all pertinent information concerning the requested analytical services and sample handling requirements and tracks the sample in the laboratory.

5.3 ANALYTICAL PROGRAM

The objective of the field investigation is to collect data to further assess hydrogeologic conditions of the on-site bedrock groundwater. To achieve this objective, the analytical program includes the collection of groundwater samples from the new bedrock monitoring wells for laboratory analysis.

Groundwater samples collected from the four bedrock wells will be analyzed for Target Compound List (TCL), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), inorganic compounds (metals and cyanide), and other parameters (hexavalent chromium, pH, chloride, and sulfate). Table 2 lists the analytical parameters to be analyzed.

Analytical procedures will be completed in accordance with NYSDEC Analytical Services Protocol (ASP), December 1991. Procedures for laboratory measurement of pH will follow current USEPA guidance that requires materials with a field measured pH greater than 12.0 to be reanalyzed in the laboratory at a temperature of 25°C. The analytical laboratory will provide analytical reports in a NYSDEC ASP Category B deliverable package.

As part of the quality assurance/quality control (QA/QC) program, duplicate samples, field blank (equipment wash blanks), and replicate samples will be incorporated into each groundwater sampling event. Duplicate samples and field blanks will each be collected at a rate of 1 per every 10 groundwater samples collected. In addition, quality control samples for groundwater sampling will include the analysis of matrix spike/matrix spike duplicate (MS/MSD) samples at a rate of one each per analytical batch (20 samples). The number of samples and associated quality control sample which will be collected during the field investigation are also listed in Table 3.

Data validation will be performed on the analytical data. Procedures that will be used for data validation will follow the guidance outlined in the following USEPA documents: *Laboratory Data Validation: Functional Guidance for Evaluating Organic Analyses* (USEPA, 1988); *Laboratory Data Validation: Functional Guidance for Evaluating Inorganic Analyses* (USEPA (1988); and, *Laboratory Data Validation: Functional Guidance for Evaluating Organic Analyses* (USEPA 1985).

6.0 PROJECT MANAGEMENT

Project management actions are addressed below to describe how the investigation program will be managed to ensure that the program will be completed on schedule in a professional and technically correct manner. The sections which follow describe the organization of project personnel performing the investigation activities, identification of proposed subcontractor lists, schedule of project activities, and reporting requirements to be carried through the completion of the project.

6.1 PROJECT ORGANIZATION

The project team for completion of the investigation program includes:

- The BOC Group, Inc.;
- Dames & Moore (Investigation Consultant);
- Analytical Laboratory Subcontractor; and,
- Drilling Subcontractor.

The role of each of these entities is discussed below. The lines of responsibility are shown on the Project Organization Chart in Figure 4.

The owner of the site is Airco Properties, Inc., and management of the property is the responsibility of The BOC Group, Inc., a parent company to Airco Properties, Inc. As shown in Figure 4, responsibility for completion of the investigation program will be delegated from The BOC Group, Inc. Program Manager to the Consultant's Project Director. Overall responsibility for the project resides with The BOC Group, Inc.'s Program Manager, Dr. Paul Krueger. Dr. Krueger will be the point of contact between The BOC Group, Inc. and the NYSDEC. Dr. Krueger will also serve as the primary point of contact for Dames & Moore, (The BOC Group, Inc.'s Consultant) working on the field investigation. In this role, he will be responsible for approval of work plans and technical and administrative procedures, as well as for ensuring that the necessary arrangements are made to facilitate the completion of the investigation.

Dames & Moore will complete the investigation activities and will be responsible for providing technical and execution of the investigation. Administrative and technical responsibility for the completion of investigation and report resides with the Dames & Moore's Project Director. Mr. Glenn Armstrong (Dames & Moore) will serve as the Project Director. The Project Director reports directly to The BOC Group, Inc.'s Program Manager and has overall responsibility for ensuring that the schedule and budgets are met. Overall project management of the investigation will be provided by Dames & Moore's Project

Manager. Mr. Peter Smith (Dames & Moore) will serve as Project Manager. He will oversee the implementation of the work plan. He will be responsible for directly managing budgets and project milestones and ensuring coordination among all field personnel working on the project and subcontractors (drilling and analytical laboratory).

Other members of the investigation team are listed in Figure 4. The technical staff for this project will be drawn from a pool of corporate resources. The technical team staff will be utilized to gather and analyze data, and to prepare reports and complete quality assurance and health and safety support during completion of the project. All of the designated technical team members are experienced professionals who possess the degree of specialization and technical competence to effectively and efficiently perform the required work.

Portions of investigation will be completed by subcontractors. These services include drilling and completion of monitoring wells and laboratory analytical services. The selected laboratory will be certified by the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) for the analysis of wastewater and solid and hazardous waste and have applicable NYSDOH Analytical Services Protocol (ASP) certifications. The final selection of the subcontractor will be made in consultation with The BOC Group, Inc. and will be based on which subcontractor can provide the package of services, pricing and quality assurance/quality controls which comply with the procedures outlined in this work plan.

The following is a listing of several qualified drilling firms and analytical testing laboratories which have been used on other projects of similar scope and which have provided satisfactory service and quality. In the event these individual firms can not provide the necessary services and quality control measures, other subcontractors may be identified and selected to perform the required tasks.

Drilling Firms:

SJB Service, Inc.
1951-1 Hamburg Turnpike
Buffalo, New York

Maxim Technologies, Inc.
5167 South Park Avenue
Hamburg, New York

Earth Dimensions, Inc.
1091 Jamison Road
Elma, New York

Analytical Laboratories:

Columbia Analytical Services
700 Exchange Street
Rochester, New York

Quanterra Environmental Services
410 William Pitt Way
Pittsburgh, Pennsylvania

RECRA Environmental, Inc.
Audubon Business Centre
10 Hazelwood Drive
Amherst, New York

6.2 PROJECT SCHEDULE

A schedule for completion of the field investigation is presented in Figure 5. Fieldwork will be initiated within four weeks of the approval of this work plan by the NYSDEC and it is anticipated that a draft investigation report will be submitted to the NYSDEC within three months of the initiation of the site field activities. A revised, final investigation report will be submitted to the NYSDEC after receipt of comments on the draft report and incorporation of appropriate responses into the final report.

The NYSDEC will be notified of scheduled activities at least one week prior to start of the activity. The NYSDEC will also be notified of changes in the project schedule, scope of field work, or other activities related to the investigation. Such changes will, however, be implemented only after agreement between the NYSDEC and The BOC Group, Inc. Finally, should the need for unforeseen changes to the schedule or modifications to the work plan become apparent during the course of the investigation, the NYSDEC will be contacted by telephone or letter, as appropriate. All telephone conversations will be followed by confirming correspondence.

7.0 SITE-SPECIFIC HEALTH AND SAFETY PLAN

The purposes of the Site-Specific Health and Safety Plan is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise while field investigations are being conducted at the site. The Site-Specific Health and Safety Plan developed for completion of the field investigation outlined in this Work Plan is presented in Appendix A.

8.0 INVESTIGATION REPORT

Following completion of the field investigation and receipt of laboratory analytical results, a draft investigation report will be prepared. The draft report will document completed investigation activities, summarize and discuss the results of the investigation, and provide interpretation of data. The draft report will also include a compilation and interpretation of historic site geologic and hydrogeologic data, as well as historic data from investigations completed at adjacent and nearby sites as relevant to the Airco parcel.

The draft report will be provided to the NYSDEC for review and comment. A final report will be prepared following receipt and review of NYSDEC comments related to the draft report.

9.0 CITIZEN PARTICIPATION PLAN

This Citizen Participation Plan outlines the citizen participation activities that will be implemented by The BOC Group, Inc. related to the remedial investigation of the Airco Properties, Inc. site in the Town of Niagara, as required by Title 6 New York Code rules and Regulations (NYCRR) Part 375 Inactive Hazardous Waste Disposal Site Remedial Program (6 NYCRR 375). The objective of the plan is promote communications between responsible parties, NYSDEC, local officials, and other interested parties, regarding the plans and status of site activities.

To achieve the plan objectives, the following activities will be implemented, in chronological order:

- Document repositories will be established at the following locations:

Town of Niagara - Town Hall
7105 Lockport Road
Niagara Falls, New York 14301

City of Niagara Falls Library
1425 Main Street
Niagara Falls, New York 14305

New York State Department of
Environmental Conservation
Region 9 Headquarters
270 Michigan Avenue
Buffalo, New York 14203
(716) 851-7220
** By Appointment

Documents including investigative work plans, investigation and evaluation reports, and other documents pertinent to the remedial investigation and evaluation of the Airco Properties, Inc. site will be made available to the public at the document repositories.

- A site-specific contact list of interested individuals, groups, officials, and media will be developed with input from the NYSDEC;
- A fact sheet describing the project and planned activities will be prepared and distributed to the site-specific contact list prior to implementing the planned activities; and,
- Representatives of The BOC Group, Inc. will be available to attend public meetings with interested parties prior to implementing the investigation and following preparation of the final investigative report, if sufficient public interest is shown.

These activities will be planned and implemented by The BOC Group, Inc., in cooperation with the NYSDEC, for work related to the Airco Properties, Inc. site. Site-specific contact lists will be used to inform interested parties of planned citizen participation activities. A schedule for implementation of the citizen participation activities will be developed upon approval of this Work Plan.

TABLE 1
PRESERVATION SUMMARY FOR GROUNDWATER SAMPLES

AIRCO PROPERTIES, INC. SITE
NIAGARA, NEW YORK

<u>Parameter</u>	<u>Container¹</u>	<u>Preservative²</u>	<u>Recommended Holding Time³</u>	<u>Amount of Sample Required</u>
Chloride	P, G	None required	28 days	50 ml
Conductivity (Specific Conductance)	P, G	Cool, 4°C	28 days	250 ml
Cyanide	P, G	Cool, 4°C NaOH to pH > 12 Asorbic acid	14 days	500 ml
Metals	P, G (Chromium IV)	HNO ₃ to pH < 2 Cool, 4°C	6 months, 28 days ⁴ 24 hours)	1 L
pH	P, G	None required	Analyze immediately	100 ml
Sulfate	P, G	Cool, 4°C	28 days	50 ml
SVOCs	Amber G	Cool, 4°C	ext. 7/14 days	1 L
Temperature	P, G	None required	Analyze immediately	100 ml
Turbidity	P, G	Cool, 4°C	48 hours	500 ml
VOCs	G	Cool, 4°C	14 days	2 x 40 ml

¹ Polyethylene (P) or Glass (G).

² Sample preservation should be performed immediately upon sample collection.

³ Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still considered valid.

⁴ Holding time for metals, except mercury is 6 months. The holding time for mercury is 28 days.

TABLE 2
ANALYTICAL PARAMETER LIST

AIRCO PROPERTIES, INC. SITE
NIAGARA, NEW YORK

TCL Volatile Organic Compounds

Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone (MEK)
Carbon Disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
Dibromochloromethane
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethene
1,2-dichloroethene (total)
1,2-dichloropropane
cis-1,3-dichloropropene
trans-1,3-dichloropropene
Ethylbenzene
2-Hexanone
Methylene chloride
4-Methyl-2-pentanone
Styrene
1,1,2,2-tetrachloroethane
Tetrachloroethene
Toluene
1,1,1-trichloroethane
1,1,2-trichloroethane
Trichloroethene
Vinyl chloride
Total Xylenes

TCL Semivolatile Organic Compounds

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(g,h,i)perylene

Butyl benzyl phthalate
Bis(2-chloroethyl)ether
Bis(2-ethylhexyl)phthalate
4-Chloro-3-methylphenol
2-Chloronaphthalene
Chrysene
o-Cresol (2-methylphenol)
p-Cresol (4-methylphenol)
Dibenzo(a,h)anthracene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2,4-Dichlorophenol
Diethyl phthalate
2,4-Dimethylphenol
Dimethyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone
Naphthalene
Pentachlorophenol
Phenanthrene
Phenol
Pyrene
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
Hexachlorobutadiene
2,2'-oxybis(1-Chloropropane)
Nitrobenzene
N-Nitroso-di-n-propylamine
2-Nitrophenol
bis(2-Chloroethoxy)methane
4-Chloroaniline
2-Methylnaphthalene
2-Nitroaniline
3-Nitroaniline

2,4-Dinitrophenol
4-Nitrophenol
Dibenzofuran
4-Chlorophenyl-phenylether
4-Nitroaniline
4,6-Dinitro-2-methylphenol
N-Nitrosodiphenylamine
4-Bromophenyl-phenylether
Carbazole
Butylbenzylphthalate
3,3'-Dichlorobenzidine

TCL Inorganic Compounds
(Total & Dissolved fractions)

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc
Cyanide

Other Parameters

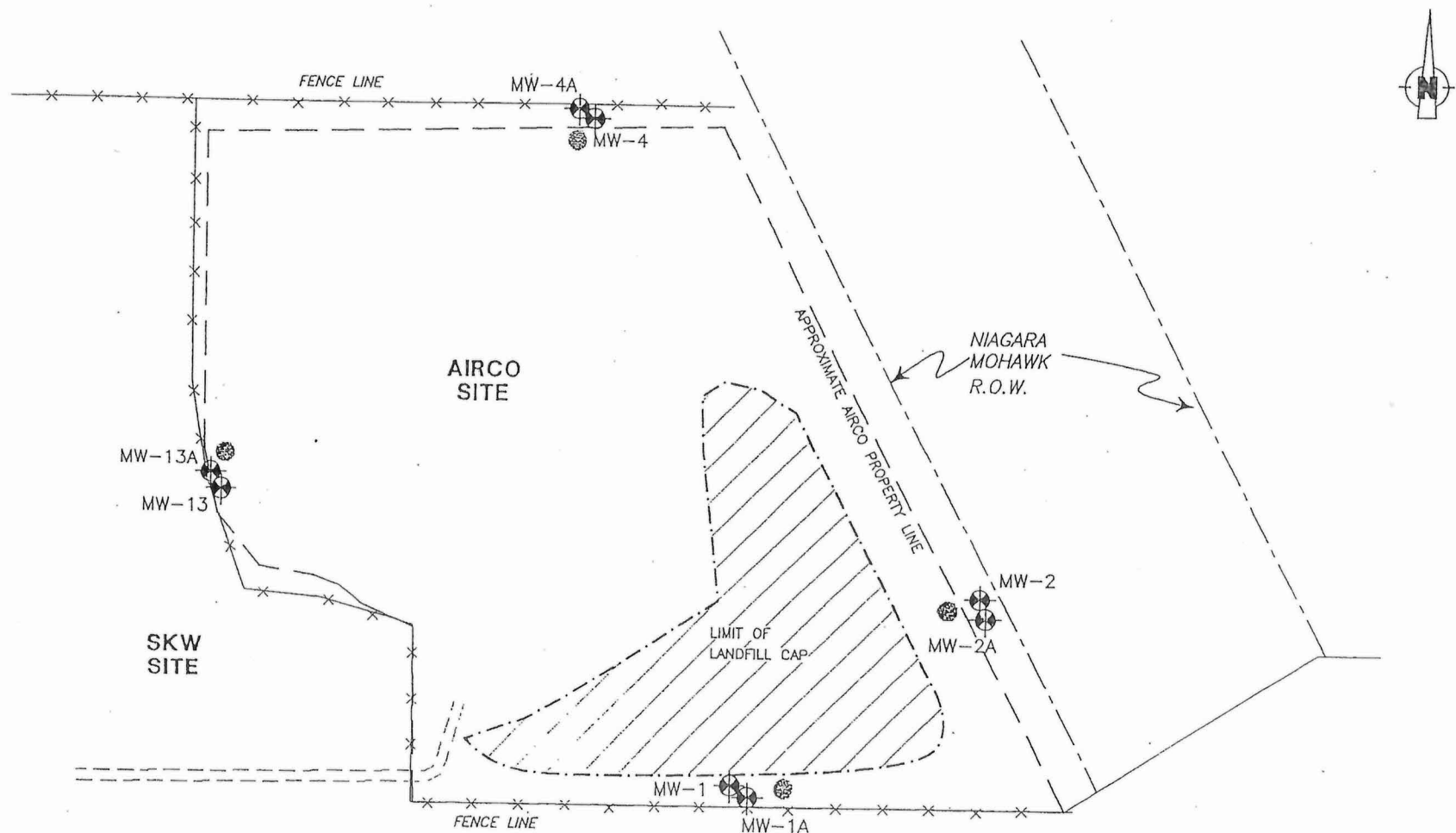
(Total & Dissolved fractions)
Hexavalent Chromium
Chloride
Sulfate
pH

TABLE 3
GROUNDWATER SAMPLING SUMMARY




AIRCO PROPERTIES, INC. SITE
NIAGARA, NEW YORK

Groundwater Samples	Field Samples	Equipment Wash Blank	MS/MSD*
VOCs	4	1	1
SVOCs	4	1	1
Inorganic Compounds (total)	4	1	1
Inorganic Compounds (dissolved)	4	1	1
Other Parameters (total)	4	1	1
Other Parameters (dissolved)	4	1	1
pH	4	1	1

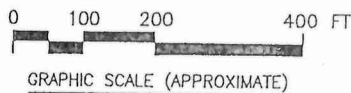
* A field sample will be designated for use as an MS/MSD sample. Additional sample volume required for matrix spike/matrix spike duplicate.



MONITORING WELL LEGEND:

- MW-13A  - SHALLOW WELLS (SCREENED IN FILL MATERIAL)
- MW-13  - OVERBURDEN WELLS (SCREENED IN SILTY SAND OVERBURDEN ABOVE BEDROCK)
-  - PROPOSED LOCATION OF BEDROCK WELL

SOURCES:
 "SITE PLAN" WOODWARD & CURRAN, INC. APRIL 12, 1996; &
 "FUND STANDBY CONTRACT AT SKW ALLOYS, SITE NO. 2, NIAGARA FALLS,
 NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION" P. 1, 2, 3, 4, 5,
 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30,
 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60,
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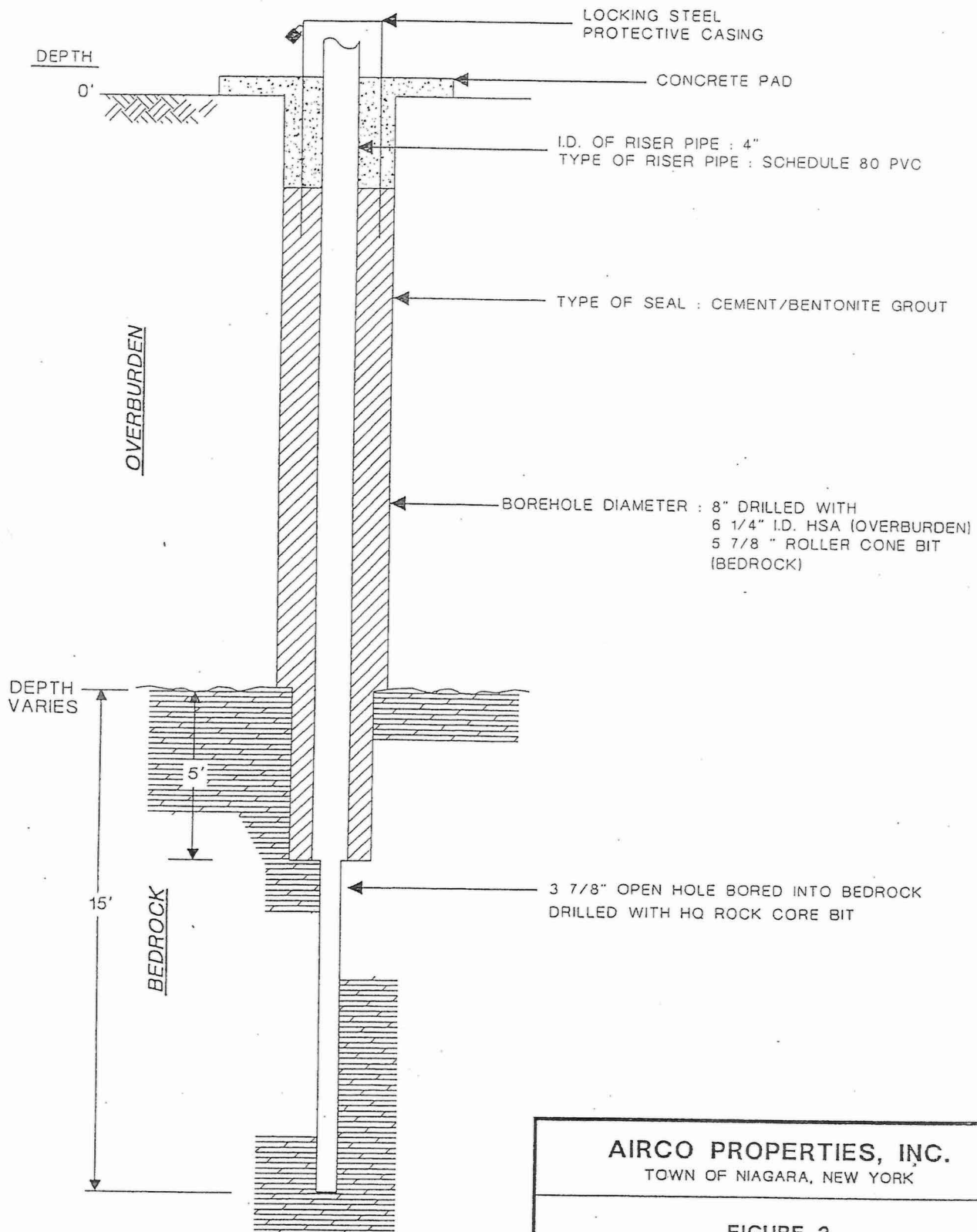
AIRCO PROPERTIES, INC.
 TOWN OF NIAGARA, NEW YORK

FIGURE 2

**SITE PLOT PLAN SHOWING
 MONITORING WELL LOCATIONS**

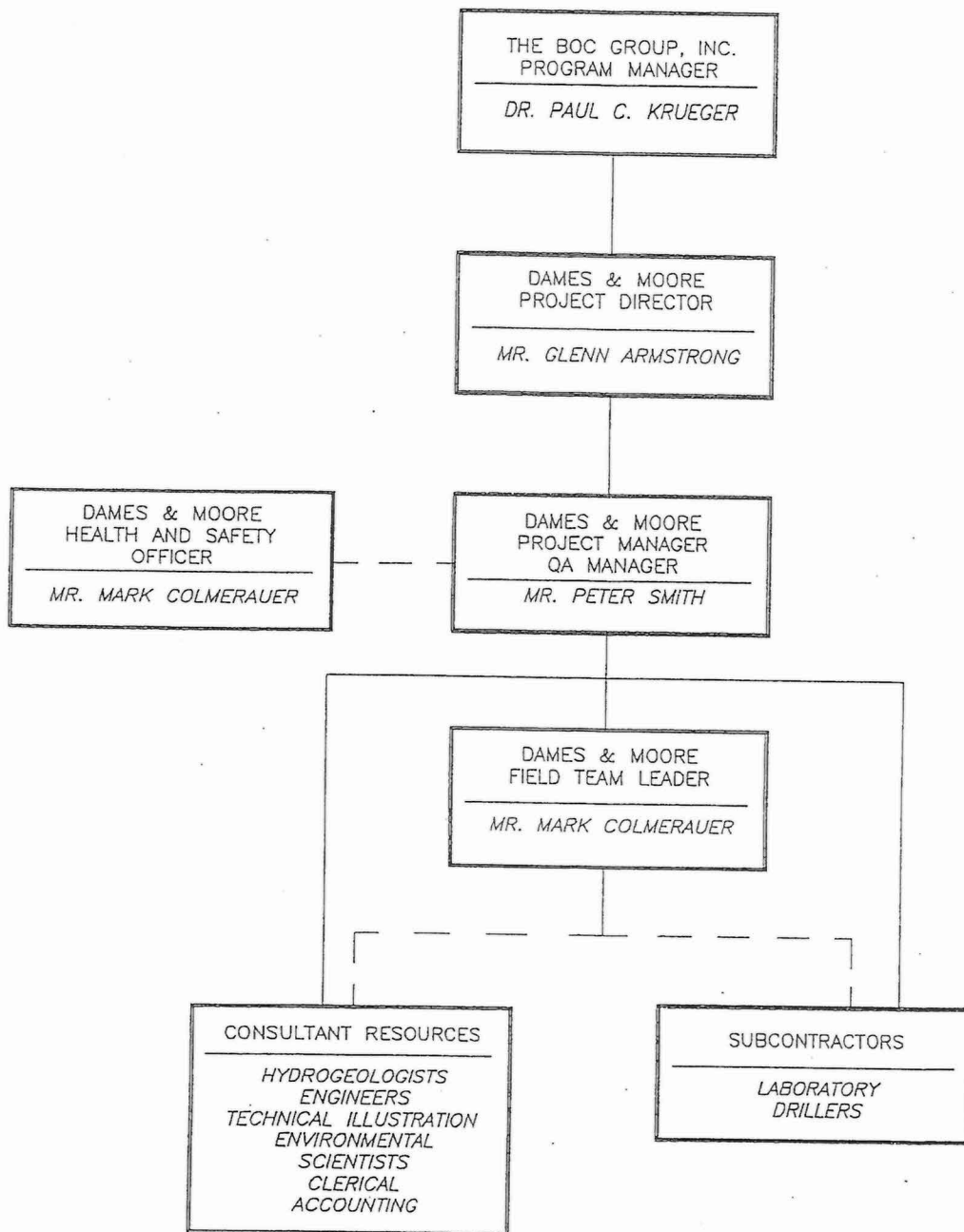
JOB No.: 242626-009-121

DAMES & MOORE



AIRCO PROPERTIES, INC.
TOWN OF NIAGARA, NEW YORK

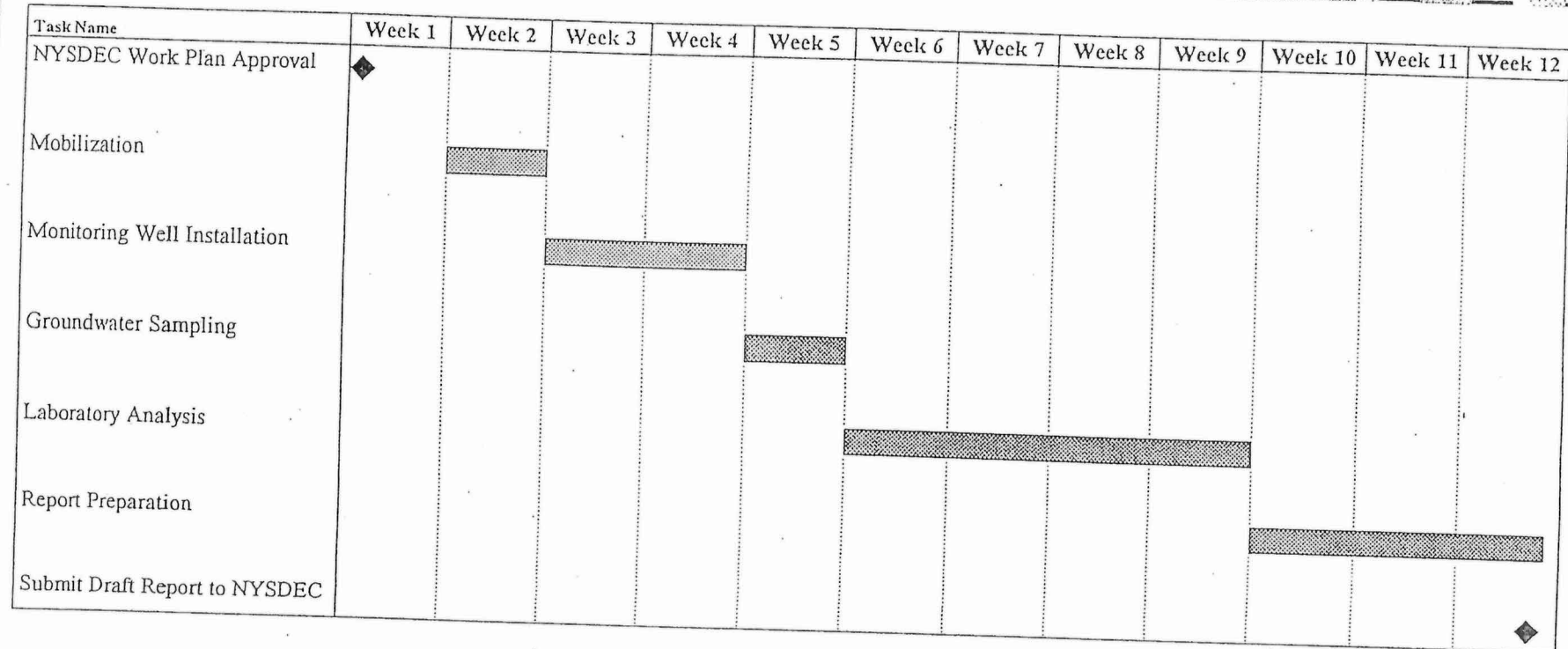
FIGURE 3
BEDROCK MONITORING WELL
COMPLETION DETAILS



AIRCO PROPERTIES, INC.
TOWN OF NIAGARA, NEW YORK

FIGURE 4

PROJECT ORGANIZATION



AIRCO PROPERTIES, INC.
TOWN OF NIAGARA, NEW YORK

FIGURE 5
PROJECT SCHEDULE

APPENDIX A

SITE-SPECIFIC HEALTH AND SAFETY PLAN



DAMES & MOORE

A DAMES & MOORE GROUP COMPANY

HEALTH & SAFETY PLAN
INSTALLATION OF BEDROCK
MONITORING WELLS

AIRCO PROPERTIES, INC. SITE
NIAGARA, NEW YORK

Prepared for:
THE BOC GROUP, INC.

JOB NO: 24268-009-5050
JANUARY 21, 1997

644 Linn Street, Suite 501
Cincinnati, Ohio 45203
Voice (513) 651-3440
Fax (513) 651-3452

EMERGENCY CONTACTS & NUMBERS:

Contact	Person or Agency	Telephone
Client Contact	Dr. Paul Krueger	(908) 665-2400
Emergency	Emergency Response System	911
Law Enforcement	Police Department	911
Fire Department	Fire Department	911
Hospital	Mt. St. Mary's 5300 Military Rd Lewiston, NY	(716) 297-4800
D&M Project Manager	Pete Smith	(716) 675-7130 (work)
D&M Principal	Glenn Armstrong	(513) 651-3440 (work) (513) 755-2820 (home)
Division Health & Safety Mgr.	Joseph Suhre, P.E.	(513) 651-3440 (work) (513) 791-7431 (home)
EPA National Response Center Chemtrec		1-800-424-8802 1-800-424-9300
Directions to hospital:	From site: Right on Witmer Road Go 1.5 mile and turn left on Military Road - hospital is 2 mile north on left	

DAMES & MOORE
SITE-SPECIFIC HEALTH AND SAFETY PLAN
AND WORKPLACE HAZARD ASSESSMENT

Project Name and Number: BOC-Airco site 24268-009-5050
Project Site Location: Niagara, NY
Project Manager: Pete Smith
Site Safety Coordinator: Mark Colmerauer
Plan Preparer: L. Bloomfield
Plan Reviewer: Joseph Suhre
Preparation Date: 1/9/97
Site work begins: 3/1/97
Plan expiration Date: 3 Months from start date

HEALTH AND SAFETY PLAN APPROVAL AND CERTIFICATION THAT WORKPLACE HAZARD
ASSESSMENT HAS BEEN PERFORMED (29 CFR 1910.132):
Approval contingent upon receipt of Subcontractor Statement of Compliance before start of work

Project Manager
Pete Smith

1/22/97 Pete Smith
(Date)

Principal in Charge
Glenn Armstrong

1/21/97 Glenn Armstrong
(Date)

Division Health and Safety Manager
Joseph B. Suhre

1/21/97 Joseph B. Suhre
(Date)

Plan Health & Safety Approval Log Number CIN GA/PS-072

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TABLES (follow text)

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- 1 Exposure Limits and Recognition Qualities
- 2 Symptoms of Overexposure, Potential Chronic Effects, and First-aid Treatment
- 3 Personal Protective Equipment Required for Site Activities
- 4 Chemical Compound Monitoring Methods, Action Levels, and Protective Measure

APPENDICES (follow tables)

Appendix A: Forms

1.0 INTRODUCTION

Presented herein is the health and safety plan for site activities to be conducted during the environmental site investigation at Airco Properties, Inc. site located on Witmer Road in Niagara, New York. The plan details safety procedures for site work, including identification of the site safety officer, field monitoring, protective gear for site workers, site waste characteristics, evaluation of potential site hazards, decontamination procedures, and emergency procedures. The plan will be amended, as appropriate, to reflect unanticipated hazards or changes in operating conditions encountered during site activities.

Site activities will be conducted by the staff of Dames & Moore and its subcontractor, (identified as Subcontractor in the remainder of this document).

2.0 APPLICABILITY

The provisions of the plan are mandatory for all onsite Dames & Moore employees engaged in investigative activities who have the potential to be exposed to onsite constituents. All Dames & Moore personnel assigned to field activities for the project must read and sign the plan acceptance form (Appendix A) before commencing site activities.

Prior to the initiation of field work for each project, the Subcontractor will submit, in writing, verification that all field personnel have completed 40 hours of training in accordance with 29 CFR 1910.120(e), that the field supervisor has completed the 8-hour supervisor course in accordance with 29 CFR 1910.120(e)(4), and that field personnel are participating in a medical surveillance program in accordance with 29 CFR 1910.120(f). Such verification should be submitted on the "Subcontractor Compliance Verification" form (Appendix A). The Subcontractor is also responsible for providing, for their own use, a site-specific health and safety plan that meets the requirements of 29 CFR 1910.120(b).

The Subcontractor is expected to provide and maintain its own safety equipment as required under its Health and Safety Program and site-specific health and safety plan. They will also provide information and training to its personnel so that they may comply with the Program and plans to be conducted at this site.

Inadequate health and safety precautions on part of the Subcontractor, or the belief that their personnel are, or may be exposed to an immediate health or safety hazard, can be the cause for

Dames & Moore to suspend the site work and ask them to evacuate the site work zone. The Subcontractor will hold Dames & Moore harmless from, and indemnify it against, all liability in the case of any injury.

3.0 SITE CHARACTERIZATION

The former Vanadium Corporation site is listed as an inactive hazardous waste site by the New York State Department of Environmental Conservation (NYDEC). The listing refers to a 115-acre property used for disposal of slag and other industrial debris. From 1971 to 1988, the 25-acre Airco Properties, Inc., portion of the site was used for disposal of air pollution control dusts from ferrochrome silicon, ferrosilicon and stainless steel pig melting operations.

4.0 SITE ACTIVITIES

Site activities will be performed outside and consist of the following:

- Drill soil borings
- Convert borings to ground water monitoring wells
- Well development and ground water sampling

5.0 HAZARD EVALUATION

The types of hazards associated with site activities, may include chemical, mechanical, electrical, physical, and temperature. A description of each is provided below. Any mechanical, electrical, physical, and/or temperature hazards associated with each field activity at the site include the following:

Job Activity	Mechanical	Electrical	Chemical	Physical	Temperature
Soil boring and observation of ground water monitoring well installation	Drill rig	Buried power line	Inhalation of toxic vapors, accidental ingestion, skin absorption, eye contact	Slip, trip, and fall	Heat or Cold Stress
Ground water investigation	None anticipated	None anticipated	Inhalation of toxic vapors, accidental ingestion, skin absorption, eye contact	None anticipated	Heat or Cold Stress

5.1 CHEMICAL

Based on the information concerning site history and operation the following are likely to be encountered:

- Soil containing heavy metals (i.e. barium & chromium)
- Potentially high pH groundwater

Site activities are not expected to pose a significant health hazard to personnel. Inhalation of site soil is readily controlled through dust suppression methods and dermal contact with site soil and water is limited through the use of appropriate PPE (see below).

Health and safety data regarding these chemicals is presented in Tables 1 & 2.

5.2 PROCEDURES FOR EXTREME WEATHER CONDITIONS

5.2.1 Heat Stress Recognition And Control

The wearing of Personal Protective Equipment (PPE) can place a worker at considerable risk of developing heat stress. This can result in health effects ranging from transient heat fatigue to serious illness or death. Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, work load, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses encountered during the investigation activities, regular monitoring and other preventive precautions are vital.

Heat stress monitoring shall commence when personnel are wearing PPE, including Tyvek®-type coveralls, and the ambient temperature exceeds 70°F. If standard work garments (cotton coveralls) are worn, monitoring shall commence at 85°F. For workers wearing standard work clothes, recommendations for monitoring and work/rest schedules are those approved by ACGIH and NIOSH. To monitor the worker the heart rate should be measured; the radial pulse should be counted during a 30-second period as early as possible in a rest period. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, the next work cycle should be shortened by one third and the rest period should be kept the same. Dames & Moore's heat stress guidelines are found in Section HS 300 of the Dames & Moore Health and Safety Manual.

5.2.1 Cold Stress Recognition And Control

Protection against cold stress should be initiated when temperatures drop below 45°F. Exposure to cold working conditions can result in cold stress (hypothermia) and/or injury (frostbite) to hands, feet, and head. Hypothermia can result when the core body temperature drops below 36°C (96.8°F). Lower body temperature will very likely result in dizziness, drowsiness, disorientation, slurred speech, or loss of consciousness, with possible fatal consequences. Pain in the extremities may be the first warning of danger to cold stress. Shivering develops when the body temperature has fallen to 35°C (95°F).

Hypothermia can be brought on by exposure to cold air, immersion in cold water, or a combination of both. Wind chill factor, the cooling power of moving air, is a critical factor in cold stress.

Adequate insulating clothing must be worn by workers if work is performed in temperatures below 4°C (40°F). At temperatures of 2°C (35.6°F or less), workers whose clothing becomes wet should be immediately provided with a change of clothing, and if necessary, treated for hypothermia. Treatment includes warming the victim with skin-to-skin contact, or by providing warm blankets or other coverings, and drinking warm liquids. Skin exposure should not be permitted at temperatures of -32°C (-25°F) or below.

If fine work is to be performed with bare hands for more than 10-20 minutes at temperatures below 16°C (60°F), provisions should be made for keeping the workers' hands warm. If equivalent chill temperatures fall below 40°F and fine manual dexterity is not required, then gloves should be worn. Metal handles of tools should be covered with insulating material at air temperatures below -1°C (30°F).

If work is to be performed continuously in the cold when the wind chill factor is at or below -7°C (19°F), heated warming shelters (tents, trailers, vehicle cabs) should be made available nearby.

5.3 PHYSICAL HAZARDS

5.3.1 Noise Hazards

If hazardous noise levels are created by the equipment or other sources at the site, the onsite Dames & Moore employee will have ear plugs available. All Dames & Moore site personnel are in the firm's Hearing Conservation Program and have had baseline and, where appropriate, annual audiograms. Personnel will wash their hands with soap and water prior to inserting ear plugs to avoid initiating ear infections. Additional information regarding Dames & Moore's Hearing Conservation Program is located in Section HS 220 of the D&M Health and Safety Program Manual, a copy of which shall be maintained on site.

5.3.2 Slip/Trip/Fall Hazards

Workers should exercise caution when walking around the site to avoid fall and trip hazards. If holes or uneven terrain are located in the work area which could cause site personnel to fall or trip, they must be covered, flagged or marked to warn workers. If conditions become slippery, workers should take small steps with their feet pointed slightly outward to decrease the probability of slipping. Workers should watch where they are walking and plan the route to walk in areas of good stability.

5.3.3 Lifting Hazards

Accidents in manual handling of materials are primarily the result of unsafe working habits- improper lifting, carrying too heavy a load, incorrect gripping, or failing to wear personal protective equipment. These may be avoided by testing the weight of an object before attempting to lift and carry it. It is not anticipated that heavy materials will be encountered at the job site by the Dames & Moore geologist/technician.

5.3.4 Vehicle Traffic Hazards

Where site activities are performed in areas of vehicle traffic, the use of protective barricades around site activity locations is required. In addition, personnel performing site activities are required to wear orange safety vests.

5.4 ELECTRICAL HAZARDS

Safe work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts. Overhead power lines, downed electrical wires, buried cables, and equipment cords all pose a danger of shock or electrocution if workers contact or sever them during field operations.

5.4.1 Electrical Equipment

Any electrical equipment used by the contractor during work activities may pose a hazard. To minimize electrical hazards, low-voltage (below 250 volts A.C.) equipment with ground-fault interrupters (GFI) and water-tight, corrosion resistant cables should be used. GFI should be used on all circuits carrying electrical power from an indoor source or a portable generator equipment or lighting. Worn switches and wiring should be quickly repaired and use of water should be controlled. Equipment should also be properly grounded as protection against shock, static, electricity, and lightning. The on-site Dames & Moore employee will notify the sub-contractor of any observed electrical hazard or non-grounded equipment.

Lockout procedures should be implemented whenever there is the possibility of a hazard due to unexpected energization during repair or maintenance of equipment.

5.4.2 Underground Utilities

The Site Manager is responsible to see that underground utility locations are identified prior to the commencement of any subsurface (> 1 ft.) activities. It will be necessary to communicate the importance of verifying underground utility lines to the sub-contractor prior to digging. Utility protection/locating services will be contacted prior to drilling at the site. Dames & Moore may review diagrams supplied by the client regarding the location of utilities. The deactivation of utilities should be certified by the proper utility company personnel, and the certification retained in the permanent log.

5.5 BIOLOGICAL/ENVIRONMENTAL HAZARDS

In addition to known potential site hazards, site personnel should survey the area for other hazards such as biological hazards (i.e., raw sewage/cesspools, sanitary landfills, hospital wastes, and dead animals). A quick survey should also be performed for additional environmental hazards

(i.e., bees, wasps, snakes, dogs, poison ivy, poison oak, etc.). If any additional hazards are identified during the survey the appropriate precautions will be taken in the field to ensure contact is not made with these hazards.

6.0 EMPLOYEE PROTECTION

Employee protection for this project includes standard safe work practices, PPE, procedures and equipment for extreme weather conditions, work, limitations, and exposure evaluation.

6.1 STANDARD SAFE WORK PRACTICES

Standard safe work practices that will be followed include:

- No digging will take place without first confirming the absence of subsurface utility lines or other buried debris.
- Eating, drinking, chewing tobacco, smoking, and carrying matches or lighters are prohibited in work areas or whenever the possibility for the transfer of potential contamination exists.
- Avoid contact with potentially contaminated materials. Do not walk through puddles, pools, mud, etc. Whenever possible, avoid kneeling on the ground, leaning, or sitting on equipment on the ground. Do not place monitoring equipment on potentially contaminated surfaces (i.e., ground, etc.).
- All field members will make use of their senses (all senses) to alert them to potentially dangerous situations in which they should not become involved (i.e., presence of strong and irritating or nauseating odors).
- Prevent splashing of potentially harmful materials.
- Practice good personal hygiene; hands should be washed before eating and when leaving site
- Field crew members will be familiar with the physical characteristics of investigations,
 - accessibility to co-workers, equipment, and vehicles
 - communication
 - areas of known or suspected contamination
 - site access
 - nearest water sources

6.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Field activities will be initiated in Level D PPE as indicated in Table 3. If field conditions indicate a higher level of constituent concentrations than anticipated, field activities will be halted, working conditions reassessed, and a higher level of PPE donned (Table 3) depending upon exposure concentrations per Table 4.

6.3 WORK LIMITATIONS

All Dames & Moore personnel scheduled for these activities have completed initial health and safety training and actual field training as specified in 29 CFR 1910.120(e), and have completed CPR and first-aid training. Documentation for Dames & Moore field personnel's health and safety training is to be maintained by the employees' office of origin.

6.4 EXPOSURE EVALUATION

An exposure history form will be completed for each Dames & Moore worker participating in site activities. The employee exposure history form (Appendix A) includes onsite monitoring results and laboratory analyses of any samples collected. A copy of the exposure history form is to be maintained in each site worker's possession, possibly with his field notes or travel equipment.

7.0 MEDICAL MONITORING REQUIREMENTS

All project personnel who plan to conduct work in the work zone areas will be included in the medical surveillance program. Access to site work zone areas will not be permitted without appropriate medical clearance. The decision of who will be included in the medical monitoring program is the responsibility of each Dames & Moore office where medical monitoring is required for site activities.

8.0 AIR MONITORING REQUIREMENTS

Air monitoring instruments will be calibrated and maintained according to manufacturer's specifications and an instrument calibration form will be maintained. A copy of the form is presented in Appendix A. Table 4 presents monitoring methods, action levels and protective measures associated with use of the following:

PID - Air monitoring will be conducted for unanticipated volatile organics (VOCs) using an HNu photoionization detector (PID) with a 10.2 eV or 11.7 eV lamp (according to Table 1).

Visual Observation - Visual observation will be used to monitor for any airborne dust that may contain heavy metals. Dust is readily controlled through dust suppression methods, i.e. wetting of soil.

8.1 MONITORING SCHEDULE - SITE CONTAMINANTS

PID - The PID will be calibrated immediately before going into the field. Upon arrival at the site and before any field activities begin, the background level will be taken and noted. All readings will be noted on an air monitoring form (Appendix A) along with the date, time, background level, weather conditions, wind direction and speed, and location where the background level was obtained. The daily background readings will take place away from the work zone areas (field activities zone) to obtain a true background reading.

The PID (HNu or equivalent) will be used during site activities (see table 4) to monitor for unanticipated VOCs. The PID will be calibrated to a benzene-equivalent standard and used to monitor the breathing zone. If breathing zone monitoring indicates a positive response that cannot be attributed to background conditions, the work zone will be evacuated and the setting reassessed after conferring with the Project Manager. If breathing zone monitoring does not yield any positive response, monitoring will be discontinued until conditions indicate a need for additional monitoring.

Activity	Equipment	Monitoring Frequency
Soil boring & groundwater sampling	PID	At least once every 30 minutes and at any other time the field personnel deems necessary.

Continuous visual observation will be used to monitor for airborne dust that may contain heavy metals.

9.0 SITE CONTROL MEASURES

To control employee exposure to hazardous substances and situations, site control measures will be followed. Appropriate site work zones will be established at each site in order to reduce the migration of site constituents into clean areas, and/or prevent access or exposure to hazardous materials and situations by unauthorized personnel. These zones will be established and exist in various degrees depending on the site activities, hazard evaluation, and site characterization. It is the responsibility of the SSO (Site Safety Officer) to establish these zones prior to any site activities. Definitions for each work zone are outlined below.

9.1 EXCLUSION ZONE

The exclusion zone is the area where site constituents are either known or likely to be present, or because of activity, will potentially harm personnel. Entry into the Exclusion Zone requires the use of PPE. Entry into and exit from this zone will be made through a designated point and all personnel and equipment must be decontaminated before exiting this zone. Tape, cones, and other appropriate barricades will be used to mechanically prevent access of unauthorized persons and traffic from the work zones.

At sites where chemical exposures are not a concern, the exclusion zone may consist of a system that isolates the work area from unauthorized access.

9.2 DECONTAMINATION ZONE

The decontamination zone is the area of contaminant reduction. The removal of contaminated PPE and the decontamination of personnel and equipment occurs in this zone. Separate decontamination areas will be established for personnel and heavy equipment, if necessary.

9.3 CLEAN ZONE

The clean zone is the area that is used for support. Personnel entering this zone do not have to comply with the training and medical requirements specified in 29 CFR 1910.120. The entry/exit point(s) from the clean zone to the decontamination zone shall be designated.

10.0 DECONTAMINATION

The Dames & Moore staff geologist/technician will change his/her latex gloves between samples in order to prevent cross contamination of samples. If Viton, Nitrile, or Neoprene gloves are necessary, they will be washed between samples. Any contaminated sampling/monitoring equipment will be thoroughly decontaminated between each sampling and prior to leaving the site. Equipment will be thoroughly washed; a portable steam cleaner may be used to decontaminate the equipment. Rinse water will be allowed to drain onsite. Further personnel and equipment decontamination will not be necessary.

11.0 CONFINED SPACES

It is not anticipated that any confined spaces will be encountered at this site for the activities covered under this safety plan.

If a confined space is identified, the Dames & Moore Confined Space Entry Program (HS 160) and the Confined Space Entry Permit provided in Dames & Moore's Health & Safety Manual will be used. Dames & Moore will rely on off-site emergency response providers in the event of an emergency rescue. Dames & Moore Procedure no. HS 160.6 covers confined space entry equipment requirements and Procedure no. HS 160.7 covers system preparation.

CONFINED SPACE ENTRY REQUIRES DIVISION GENERAL MANAGER (OR HIS DESIGNEE) APPROVAL.

12.0 SPILL CONTAINMENT PROGRAM

Spill containment measures are not expected to be a concern at the site. However, if any drum or container handling operations are to be conducted at this site, they will be conducted in accordance with 29 CFR 1910.120 (j).

12.1 SPILL OR HAZARDOUS MATERIALS RELEASE

Small spills are immediately reported to the SSO and are dealt with according to the chemical manufacturers' recommended procedures found on the MSDS. Steps will be taken to contain and/or collect small spills for approved storage and disposal.

In the unlikely event of a larger release of hazardous materials as a result of site activities, site personnel will evacuate to the predesignated assembly area. The local Designated Emergency Response Authority (DERA) will be notified by the SSO immediately and appropriate actions will be taken to protect the public health and mitigate the contaminant release. The DERA can be reached through the local police or fire department. Emergency contacts will be made by the Site Safety officer or Site Manager. The SSO will contact the Division Health and Safety Manager and the Project Manager. Emergency Contact numbers are listed on the first page behind the Cover Page of this plan.

12.2 SAMPLE SHIPMENT/HAZARDOUS MATERIALS SHIPMENT

If the samples to be collected during the course of this project fall under the criteria that defines them as hazardous materials under DOT regulations 49 CFR Parts 171-177 (see Dames & Moore guidelines for determination), then they must be shipped in accordance with those regulations by an individual who is certified as having been Function-Specific trained as required under the DOT regulations. However, it is not anticipated that any soil or water samples will be hazardous according to DOT regulations.

13.0 AUTHORIZED PERSONNEL

The field manager will direct onsite investigations and operational efforts. The field manager/SSO, has primary responsibility for:

- Assuring that a copy of the health and safety plan is maintained onsite during all field activities
- Assuring that appropriate PPE and monitoring equipment are available and properly utilized by all onsite personnel
- Assuring that personnel are aware of the provisions of this plan, are instructed in the work practices necessary to ensure safety, and are familiar with planned procedures for dealing with emergencies
- Assuring all field personnel have had a minimum of 40 hours training and have been fit-tested for the appropriate respirators
- Being aware of the provisions of the plan, instructed in the work practice necessary to ensure safety, and in planned procedures for dealing with emergencies
- Being aware of the potential hazards associated with site operations
- Correcting any work practices or conditions that may result in injury or exposure to hazardous substances

- Preparing any accident/incident reports, in the event of an accident (Appendix A)

14.0 EMERGENCY RESPONSE PLAN

If any situation or unplanned occurrence requires outside or support services, the client representative, will be informed and the appropriate contact will be made. The contacts and emergency telephone numbers are listed on the cover page.

14.1 SITE RESOURCES

The site vehicle will be used as field office for the site. Equipment and supplies for field activities, decontamination and health and safety requirements will be stored here. The health and safety plan will be maintained here at all times. One Type C fire extinguisher will be onsite. Portable eye wash facilities and first-aid kits will also be available. All site personnel have been trained in first aid and CPR. The site worker is responsible to maintain and bring his or her certification records with them on site.

14.2 EMERGENCY PROCEDURES

It will be important to recognize and plan for any unexpected emergency that may develop onsite. Planning and procedures outlined below are to be followed.

14.2.1 Emergency Planning

Emergency planning will be discussed during the site safety briefings prior to the start of work each day. The Site Safety form must be filled out daily and the names of everyone present must be entered (Appendix A). In the discussion of the work for the day, considerations will be given to any possibilities of emergency situations that could develop as a result of the day's field activities. All field personnel, including the sub-contractor, will need to know the location of emergency supplies and first aid equipment. All site personnel must also be aware of any special concerns specific for the site that might cause injury, illness, or create an emergency situation. Site work area entrance and exit routes will be planned and emergency escape routes delineated by the SSO, if he feels it is necessary. All site personnel should know the location of the hospital and have access to emergency phone numbers in the event of a crisis or emergency situation. All field personnel will have access to this plan.

14.2.2 Emergency Conditions

Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experience any adverse effects or symptoms of exposure while on the scene
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated

The following emergency procedures will be followed:

- In the event that a member of the field crew experiences any adverse effects or symptoms of exposure while on the scene, the entire field crew will immediately halt work and act according to the instructions provided by the SSO.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated will result in the suspension of work until the office safety coordinator has been notified and appropriate instructions have been provided to the field team.
- In the event that an accident occurs, the project manager is to complete an Accident Report Form (found in Appendix A) for submittal to the managing associate of the office. A copy will be forwarded to the firmwide and regional health and safety program offices.

14.3 EVACUATION ROUTES

In the event of an emergency, evacuation routes will be established by the SSO. Evacuation should be conducted immediately without regard for equipment for extreme emergencies. The following guidelines shall be followed for an emergency evacuation.

- Notification will be three short blasts on an air horn, vehicle horn, or by verbal communication.
- Stay upwind of smoke, vapors, or spill.
- Supervisors will conduct a head count to ensure all personnel have been evacuated.
- If necessary, site personnel will secure the area.
- Workers shall not re-enter the evacuated area until notified that it is safe.

The client shall be responsible for reporting incidents to the appropriate local, state, and federal agencies. The SSO will immediately notify the Division Health and Safety Manager and Project Manager in the event of an emergency.

14.4 BLOODBORNE PATHOGENS

For purposes of this health and safety plan, personnel fall into the category of classification B in Dames & Moore's Bloodborne Pathogens Program, which are jobs where required tasks normally do not but could involve exposure to blood, bodily fluids, or tissues--for example, in the event first aid or CPR is required. If exposure to blood, bodily fluids, or tissues occurs, universal precautions using the appropriate PPE and sanitary procedures will minimize the chance of contracting disease.

14.4.1 Universal Precautions

- Wash hands with soap and water as soon as possible after accidental contact with blood, bodily fluids, or human tissue from an injured worker. When washing facilities are not readily available, antiseptic hand cleansers shall be used.
- Wear gloves when anticipating contact with blood, bodily fluid, tissues, mucous membranes, or contaminated surfaces, or if breaks in the skin are present.
- Wear appropriate protective equipment at all times, including a mask and eye protection, if aerosolization or splattering is likely to occur when attending to an injured worker or when conducting normal work routines.
- Insure that mouthpieces and appropriate personal protective equipment are readily available in first aid kits.
- Report immediately to the Site Safety Officer all cuts, mucosal splashes, or contamination of open wounds with blood or bodily fluids.
- Dispose of all spills which contain or may contain biological contaminants in accordance with policies for hazardous waste disposal. Until cleanup is complete, an accident area should be roped off from other workers.

The following work practice controls shall also be used to eliminate or minimize employee exposure. Where occupational exposure remains after instituting these controls, personal protective equipment shall also be used.

- Ingestion of bloodborne pathogens- Eating, drinking, smoking, applying cosmetics, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure. Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets, or on countertops of bench tops where blood or other potentially infectious materials are present.

- If handling potentially infectious bodily parts following dismemberment in an accident, specimens of blood or other potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping. The container shall be labeled or color coded according to labeling requirements and closed prior to storage, transportation, or shipping. If outside contamination of the primary container occurs, the primary container shall be placed within a secondary container that is puncture-resistant and prevents leakage.
- Equipment (such as drill rigs or equipment used in first aid response) which may become contaminated with blood or other potentially infectious materials shall be examined prior to servicing or shipping and decontaminated as necessary, unless the site supervisor determines that decontamination of such equipment is not feasible. A readily observable biohazard label shall be attached to the equipment stating which portions remain contaminated. The site supervisor shall insure that this information is conveyed to all affected employees, the servicing representative and/or manufacturer as appropriate, prior to handling, servicing or shipping so that appropriate precautions may be taken.
- Personal protective equipment-appropriate personal protective equipment will be provided, such as gloves and mouthpieces in the first aid kit.
- All emergency first aid kits will contain red biohazard bags to contain waste created in first aid/emergency situations.
 - Gloves will be worn at all times
 - Containers will not be overfilled
 - Containers will be tightly closed or sealed prior to transportation
 - Pools of blood, bodily fluid, tissue, or spills from biohazard waste containers shall be cleaned up with sodium hypochlorite or Chlorox bleach, 1 part to 10 parts water.

Employees who have had an exposure incident will be referred for a confidential post-exposure evaluation and follow-up. This will be made available within a reasonable time and location, and performed by or under the supervision of a licensed physician or licensed healthcare professional.

When an exposure incident is reported, the Project Manager will complete the Bloodborne Pathogens Incident Evaluation Form (copy found in Appendix A) and will immediately refer the employee for a confidential medical evaluation and follow-up. This referral must be made within 24 hours.

14.4.2 Decontamination of Equipment

1. Clean spills from around equipment immediately.

2. Employees engaged in cleaning equipment shall use personal protective equipment that will insure that there is no contact of potentially contaminated material with skin or personal clothing.
3. Clean large equipment with a germicidal detergent or bleach (1 part to 10 parts water), avoiding splatter or dripping. If dripping is reasonable anticipated, use a drop cloth under the equipment being cleaned.
4. Wipe contamination from small, reusable equipment. Label the equipment with warning labels indicating which parts are contaminated before sending it to an appropriate location for reprocessing.
5. All cleaning materials and personal protective equipment shall be disposed of as infectious waste or properly prepared for transport to a laundry as potentially infectious laundry.
6. Wash hands after removal of personal protective equipment.

15.0 HAZARD COMMUNICATION

The Dames & Moore Hazard Communication Program (Health & Safety Manual section HS 140) complies with the OSHA Hazard Communication Standard found in 20 CFR 1910.1200 and 20 CFR 1926.59, which applies to any chemical present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency. Although waste materials are excluded from the OSHA requirement, decontamination chemicals for sampling apparatus or protective clothing (such as acetone, isopropanol, hexane, Alconox, or trisodium phosphate); calibration gases for monitoring equipment (such as isobutylene gas); and sample preservation chemicals (such as nitric acid, sulfuric acid, or hydrogen chloride solutions) require Material Safety Data Sheets (MSDSs).

The principle of communicating the hazards of materials used in the workplace to employees applies broadly to firmwide activities, from informational programs on the conduct of hazardous waste activities to the firm's insistence upon adequate safety and health training. It is also important for personnel to have an awareness of client concern for Hazard Communication due to Federal, state, and local regulations directly affecting certain client activities.

In order to comply with Hazard Communication Standard (29 CFR 1910.1200), Dames & Moore has determined that:

- All containers of hazardous chemicals must be appropriately labeled or tagged to identify the hazard and provide information on effects and appropriate protective measures.

- Labels, tags, or signs must be properly affixed and visible at all times while a hazard is present and removed promptly when the hazard no longer exists.
- Written information (MSDSs) on hazardous chemicals in the workplace must be available to employees working with the substance.
- Appropriate MSDSs will be available to any contractor or subcontractor employees working in Dames & Moore offices or laboratories or at construction, excavation, or other sites under Dames & Moore's control.
- Hazard Communication Training is provided to Dames & Moore employees.

It is anticipated that MSDS for isobutylene, nitric acid, and sulfuric acid are required for this project. MSDS for these materials are attached to this health & safety plan. The site Health & Safety Officer will be responsible for procuring MSDS sheets for any additional hazardous chemicals brought to the site for use on this job.

16.0 FORMS

The following forms will be used in implementing this health and safety plan and will be completed as follows:

- Site Safety Briefing form will be completed on a daily basis by the safety officer.
- The Plan Acceptance form will be completed by all employees working at the site prior to commencement of site activities.
- The Plan Feedback form will be completed by the onsite safety officer and any other onsite employee who wishes to fill one out.
- The Accident Report form will be completed by the project manager in the event that an accident occurs.
- Daily Instrument Calibration and Air Monitoring forms will be completed by those field technicians assigned for operation of the equipment.
- Subcontractor's Statement of Compliance will be completed by the sub-contractor before any field activities begin.
- The Employee Exposure History form will be completed by both the project manager and the individual(s) for which the form is intended.
- The Bloodborne Pathogen form will be completed if there is an incident of exposure to blood or other body fluids, contacted either through emergency rescue services or from waste contaminants in the field
- Emergency Response Checklist is used to remember emergency procedures.

All completed forms should be returned to the office OSC for retention in project files.

TABLE 1
EXPOSURE LIMITS AND RECOGNITION QUALITIES

Compound	Exposure Limits		IDLH	Exposure Warning Properties Odor/Irritant	LEL (Percent)	Photoionization Meter Information	
	8-Hr. TWA	STEL*				Ionization Potential (eV)	Lamp (eV)
Barium	0.5 mg/m ³	N/A	250 mg/m ³	No/Yes	N/A	N/A	N/A
Chromium	1 mg/m ³		500 mg/m ³	No/No	0.23	N/A	N/A

Notes:

Sources - Occupational Health Services, HAZARDLINE 1988; Hazardous Substance Data Bank, National Library of Medicine, 1991
29 CFR 1910.1,000

CA - Potential Human Carcinogen

N/A - Not applicable

*STEL - Short-Term Exposure Limit

TABLE 2
SYMPTOMS OF OVEREXPOSURE, POTENTIAL
CHRONIC EFFECTS, AND FIRST-AID TREATMENT

Chemical (Compound)	Routes of Entry	Eye Irritant	Acute Symptoms	Chronic Effects
Barium	Inhalation, ingestion, skin or eye contact	Yes	Skin irritation, dermatitis, eye irritation, respiratory irritation, muscular spasm, slow pulse, nausea, vomiting, diarrhea, abdominal pain, anxiety, weakness, back pain, dizziness	Hypertension, convulsions, cardiac failure, paralysis, hypothermia
Chromium	Inhalation, ingestion, skin or eye contact	Yes	Mucous membrane irritation, skin irrita- tion, eye irritation, vomiting, abdominal cramps, gastrointestinal disturbances	Nasal septum ulceration

GENERAL FIRST AID TREATMENT (A first-aid kit will be kept in the site vehicle)

Eye	Irrigate immediately (A portable eye-wash unit will be kept in the site vehicle)
Skin	Soap wash promptly
Inhalation	Move to fresh air
Ingestion	Get medical attention

Source: Occupational Health Services, 1987 and 1988, HAZARDLINE.

TABLE 3
PERSONAL PROTECTIVE EQUIPMENT
REQUIRED FOR SITE ACTIVITIES

LEVEL D		
Activity	Location	Protective Equipment
Soil boring and sampling, observation of monitor well installation	Boring sites	<ul style="list-style-type: none"> • Long-sleeved shirt and pants and/or coveralls • Hard hat • Safety glasses • Safety shoes • Rubber overboots¹ • Viton or Neoprene or latex gloves² • Appropriate clothing for weather conditions • Disposable dust respirator³
Groundwater sampling	Monitoring wells	<ul style="list-style-type: none"> • Long-sleeved shirt and pants and/or coveralls • Hard hat • Safety glasses • Safety shoes • Rubber overboots¹ • Viton or Neoprene or latex gloves² • Appropriate clothing for weather conditions • Disposable dust respirator³

¹ For muddy conditions.

² Latex where sample contaminants < detection limits; Viton or Neoprene over latex where sample contaminants ≥ detection limits

³ Dusty conditions

TABLE 4

CHEMICAL COMPOUND MONITORING METHODS,
ACTION LEVELS, AND PROTECTIVE MEASURES

CONDITIONS and ACTIONS in LEVEL D PPE

Chemical Compound	Monitoring Method	Action Level	Protective Measures
Volatile and semi-volatile organic compounds (unanticipated)	HNu with 11.7 probe	<1 ppm above background in the site workers' breathing zone	Continue working, and monitor for volatiles at least every 30 minutes
		sustained readings of VOCs w/ HNu ≥ 1 ppm & <5 ppm above background in the site workers' breathing zone	Call Project Manager
Metal-contaminated dust	Visual observation	Visible dust	Employ dust suppression (e.g. water spray on soil)

SCOTT SPECIALTY GASES >> ISOBUTYLENE IN AIR
MATERIAL SAFETY DATA SHEET

FSC: 6665

NIIN: 012148247

Manufacturer's CAGE: 51847

Part No. Indicator: A

Part Number/Trade Name: ISOBUTYLENE IN AIR

General Information

Item Name: CALIBRATION GAS CYL
Manufacturer's Name: SCOTT SPECIALTY GASES
Manufacturer's Street: ROUTE 611 NORTH
Manufacturer's City: PLUMSTEADVILLE
Manufacturer's State: PA
Manufacturer's Country: US
Manufacturer's Zip Code: 18949
Manufacturer's Emerg Ph #: 215-766-8861; 908-754-7700
Manufacturer's Info Ph #: 215-766-8861
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 002
Status: SMJ
Date MSDS Prepared: 23APR92
Safety Data Review Date: 27SEP94
MSDS Serial Number: BVRGC
Hazard Characteristic Code: G3
Report for NIIN: 012148247

Ingredients/Identity Information

Proprietary: NO
Ingredient: PROPENE, 2-METHYL-; (ISOBUTYLENE)
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: UD0890000
CAS Number: 115-11-7
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: AIR, COMPRESSED
Ingredient Sequence Number: 02
NIOSH (RTECS) Number: 1004033AC
CAS Number: 25635-88-5
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS GAS W/POSSIBLE SLIGHT OLEFINIC ODOR.
Boiling Point: -318F, -194C
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): 1.2
Specific Gravity: 0.88 (H*20=1)
Evaporation Rate And Ref: NOT APPLICABLE
Solubility In Water: INSOLUBLE
Percent Volatiles By Volume: 100
Report for NIIN: 012148247

Fire and Explosion Hazard Data

Flash Point: NONFLAMMABLE
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: USE WHAT IS APPROPRIATE FOR SURROUNDING FIRE.
Special Fire Fighting Proc: USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N). USE WATER SPRAY TO KEEP FIRE EXPOSED CYLINDERS COOL.
Unusual Fire And Expl Hazrds: COMPRESSED AIR AT HIGH PRESSURES WILL ACCELERATE THE BURNING OF FLAMMABLE MATERIALS.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: NONE.
Hazardous Decomp Products: NONE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ACUTE: CONCENTRATION OF ISOBUTYLENE IS THIS MIXTURE SHOULD NOT PRESENT ANY SYMPTOMS OF TOXICITY. CHRONIC: NONE.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT
Signs/Symptoms Of Overexp: NONE SPECIFIED BY MANUFACTURER.
Med Cond Aggravated By Exp: NONE.
IMMEDIATELY FLUSH W/POTABLE WATER FOR A MINIMUM OF 15 MINUTES, SEEK ASSISTANCE FROM MD (FP N). SKIN: FLUSH W/COPIOUS AMOUNTS OF WATER. CALL MD (FP N). INHAL: IMMEDIATELY REMOVE VICTIM TO FRESH AIR. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUATE & VENTILATE AREA. REMOVE LEAKING CYLINDER TO EXHAUST HOOD OR SAFE OUTDOORS AREA IF THIS CAN BE DONE SAFELY. Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER. Waste Disposal Method: DISPOSAL MUST BE I/A/W FEDERAL, STATE & LOCAL REGULATIONS (FP N). RETURN CYLS TO SUPPLIER FOR PROPER DISP W/ANY VALVE OUTLET PLUGS/CAPS SECURED & VALVE PROT CAP IN PLACE. ALLOW GAS TO DISCHARGE AT SLOW RATE TO ATM IN UNCONFINED AREA/EXHST HOOD. Precautions-Handling/Storing: STORE IN WELL VENTILATED AREAS ONLY. KEEP Report for NIIN: 012148247 VALVE PROT CAP ON CYLS WHEN NOT IN USE & SECURE CYL WHEN USING TO PROT FROM FALLING. Other Precautions: USE SUITABLE HAND TRUCK TO MOVE CYLS. PROT CYLS FROM PHYSICAL DMG. DO NOT DEFACE CYLS/LBLS. MOVE CYL W/ADEQ HAND TRUCK. CYL SHOULD BE REFILLED BY QUALIFIED PRODUCERS OF COMPRESSED GAS. SHIPMENT OF COMPRESSED GAS CYL WHICH HAS NOT (SUPDAT)

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVED SCBA IN CASE OF EMERGENCY OR NON-ROUTINE USE. Ventilation: PROVIDE ADEQUATE GENERAL & LOCAL EXHAUST VENTILATION. Protective Gloves: RUBBER GLOVES. Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N). Other Protective Equipment: WEAR SAFETY SHOES. A SAFETY SHOWER & EYEWASH STATION SHOULD BE READILY AVAILABLE. Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER. Suppl. Safety & Health Data: OTHER PREC:BEEN FILLED BY OWNER OR WITH HIS WRITTEN CONSENT IS A VIOLATION OF FEDERAL LAW (49 CFR).

Transportation Data

Trans Data Review Date: 94269
Report for NIIN: 012148247

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 27SEP94
Label Date: 26SEP94
Label Status: B
Common Name: ISOBUTYLENE IN AIR
Chronic Hazard: NO
Acute Health Hazard-None: X
Contact Hazard-None: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Report for NIIN: 012148247
Special Hazard Precautions: ACUTE:CONCENTRATION OF ISOBUTYLENE IS THIS MIXTURE SHOULD NOT PRESENT ANY SYMPTOMS OF TOXICITY. CHRONIC:NONE LISTED BY MANUFACTURER.
Protect Eye: X
Protect Skin: X

Protect Respiratory: X
Label Name: SCOTT SPECIALTY GASES
Label Street: ROUTE 611 NORTH
Label City: PLUMSTEADVILLE
Label State: PA
Label Zip Code: 18949
Label Country: US
Label Emergency Number: 215-766-8861; 908-754-7700

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: NITRIC ACID
FORMULA: HNO₃
FORMULA WT: 63.01
CAS NO.: 7697-37-2
NIOSH/RTECS NO.: QU5775000
COMMON SYNONYMS: HYDROGEN NITRATE; AZOTIC ACID
PRODUCT CODES: 4801, 9605, 9602, 9598, 9606, 9601, 5371, 9597, 9600, 5113, 9616
EFFECTIVE: 09/10/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 3 SEVERE (POISON)
FLAMMABILITY - 0 NONE
REACTIVITY - 3 SEVERE (OXIDIZER)
CONTACT - 4 EXTREME (CORROSIVE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER

STRONG OXIDIZER - CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE
LIQUID AND VAPOR CAUSE SEVERE BURNS - MAY BE FATAL IF SWALLOWED
HARMFUL IF INHALED AND MAY CAUSE DELAYED LUNG INJURY
SPILLAGE MAY CAUSE FIRE OR LIBERATE DANGEROUS GAS

KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS. DO NOT
STORE NEAR COMBUSTIBLE MATERIALS. DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE
VENTILATION. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL,
OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATERSPRAY.

SAF-T-DATA(TM) STORAGE COLOR CODE: YELLOW (REACTIVE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
NITRIC ACID	65-75	7697-37-2

3 - PHYSICAL DATA

BOILING POINT: 121 C (250 F) VAPOR PRESSURE (MM HG):
MELTING POINT: -42 C (-44 F) VAPOR DENSITY (AIR=1):
SPECIFIC GRAVITY: 1.41 EVAPORATION RATE: N/A
(H2O=1) (BUTYL ACETATE=1)
SOLUBILITY (H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100
APPEARANCE & ODOR: COLORLESS LIQUID, WITH CHOKING ODOR.

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 3-0-0 OXY
FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %
FIRE EXTINGUISHING MEDIA
USE WATER SPRAY.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED
BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.
MOVE EXPOSED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK.
USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL; DO NOT GET WATER INSIDE
CONTAINERS.

UNUSUAL FIRE & EXPLOSION HAZARDS

STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.

TOXIC GASES PRODUCED

NITROGEN OXIDES, HYDROGEN GAS

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3 (2 PPM)
SHORT-TERM EXPOSURE LIMIT (STEL): 10 MG/M3 (4 PPM)
PERMISSIBLE EXPOSURE LIMIT (PEL): 5 MG/M3 (2 PPM)
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE

INHALATION OF VAPORS MAY CAUSE NAUSEA, VOMITING, LIGHTHEADEDNESS OR HEADACHE.

INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM. INHALATION OF VAPORS MAY CAUSE COUGHING, CHEST PAINS, DIFFICULTY BREATHING, OR UNCONSCIOUSNESS.

CONTACT WITH LIQUID OR VAPOR MAY CAUSE SEVERE IRRITATION OR BURNS OF THE SKIN, EYES, AND MUCOUS MEMBRANES.

INGESTION MAY CAUSE SEVERE BURNS TO MOUTH, THROAT, AND STOMACH. MAY HAVE ADVERSE EFFECT ON KIDNEY FUNCTION AND MAY BE FATAL.

INGESTION IS HARMFUL AND MAY BE FATAL.

TARGET ORGANS

EYES, SKIN, RESPIRATORY SYSTEM, TEETH

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

CALL A PHYSICIAN.

IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.

WASH CLOTHING BEFORE RE-USE.

6 - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, LIGHT, MOISTURE

INCOMPATIBLES: STRONG BASES, COMBUSTIBLE MATERIALS,
STRONG REDUCING AGENTS, ALKALIES, MOST COMMON METALS,
ORGANIC MATERIALS, ALCOHOLS, CARBIDES

DECOMPOSITION PRODUCTS: OXIDES OF NITROGEN, HYDROGEN

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER. KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL.

J. T. BAKER NEUTRASORB(R) OR NEUTRASOL(R) "LOW NA+" ACID NEUTRALIZERS ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002 (CORROSIVE WASTE)

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 100 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, ACID-RESISTANT GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: YELLOW (REACTIVE)

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE AND COMBUSTIBLE MATERIALS.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION**DOMESTIC (D.O.T.)**

PROPER SHIPPING NAME	NITRIC ACID (OVER 40%) POISON - INHALATION HAZARD
HAZARD CLASS	OXIDIZER
UN/NA	UN2031
LABELS	OXIDIZER, CORROSIVE, POISON
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	NITRIC ACID
HAZARD CLASS	8
UN/NA	UN2031
LABELS	CORROSIVE

End

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SULFURIC ACID
FORMULA: H₂SO₄
FORMULA WT: 98.08
CAS NO.: 7664-93-9
NIOSH/RTECS NO.: WS5600000
COMMON SYNONYMS: OIL OF VITRIOL
PRODUCT CODES: 5030, 9691, 9675, 5340, 9679, 9687, 9674, 9686, 9694, 9681, 5374, 9688
9673, 5432, 5137, 9685, 4802, 9684, 9683, 5643, 9680
EFFECTIVE: 09/08/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA (TM) SYSTEM

HEALTH	- 3	SEVERE (POISON)
FLAMMABILITY	- 0	NONE
REACTIVITY	- 3	SEVERE (WATER REACTIVE)
CONTACT	- 4	EXTREME (CORROSIVE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
HARMFUL IF INHALED
CAUSES SEVERE BURNS
MAY BE FATAL IF SWALLOWED
REACTS VIOLENTLY WITH WATER.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. LOOSEN CLOSURE
CAUTIOUSLY. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER
HANDLING. IN CASE OF SPILL NEUTRALIZE WITH SODA ASH OR LIME AND PLACE IN
DRY CONTAINER.

SAF-T-DATA (TM) STORAGE COLOR CODE: WHITE (CORROSIVE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SULFURIC ACID	90-100	7664-93-9

3 - PHYSICAL DATA

BOILING POINT: 327 C (621 F) VAPOR PRESSURE (MM HG): <0.3
MELTING POINT: -2 C (28 F) VAPOR DENSITY (AIR=1): 3.4
SPECIFIC GRAVITY: 1.84 EVAPORATION RATE: <1
(H2O=1) (BUTYL ACETATE=1)
SOLUBILITY (H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: N/A
APPEARANCE & ODOR: CLEAR, COLORLESS TO LIGHT YELLOW, OILY ODORLESS LIQUID.

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 3-0-2 W
FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %
FIRE EXTINGUISHING MEDIA
USE DRY CHEMICAL OR CARBON DIOXIDE. DO NOT USE WATER.
SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED
BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.
DO NOT GET WATER INSIDE CONTAINERS.

UNUSUAL FIRE & EXPLOSION HAZARDS

REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN
EXPLOSIVE MIXTURE WITH AIR.
A VIOLENT EXOTHERMIC REACTION OCCURS WITH WATER. SUFFICIENT HEAT
MAY BE PRODUCED TO IGNITE COMBUSTIBLE MATERIALS.

TOXIC GASES PRODUCED
SULFUR DIOXIDE

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1 MG/M3 (PPM)
PERMISSIBLE EXPOSURE LIMIT (PEL): 1 MG/M3 (PPM)
TOXICITY: LD50 (ORAL-RAT) (MG/KG) - 2140
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE

INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM.
LIQUID MAY CAUSE SEVERE BURNS TO SKIN AND EYES.
INGESTION IS HARMFUL AND MAY BE FATAL.
INGESTION MAY CAUSE NAUSEA AND VOMITING.
INGESTION MAY CAUSE SEVERE BURNS TO MOUTH, THROAT, AND STOMACH. MAY HAVE
ADVERSE EFFECT ON KIDNEY FUNCTION AND MAY BE FATAL.

CHRONIC OVEREXPOSURE MAY RESULT IN LUNG DAMAGE.

TARGET ORGANS

RESPIRATORY SYSTEM, EYES, SKIN, TEETH

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

CALL A PHYSICIAN.

IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR
MILK OF MAGNESIA.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR
AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

6 - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE, HEAT

INCOMPATIBLES: WATER, MOST COMMON METALS, ORGANIC MATERIALS,
STRONG REDUCING AGENTS, COMBUSTIBLE MATERIALS,
STRONG BASES, STRONG OXIDIZING AGENTS

DECOMPOSITION PRODUCTS: OXIDES OF SULFUR

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
STOP LEAK IF YOU CAN DO SO WITHOUT RISK. DO NOT USE WATER.
NEUTRALIZE SPILL AND/OR WASHINGS WITH SODA ASH OR LIME.
WITH CLEAN SHOVEL, PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER.
MOVE CONTAINER(S) FROM SPILL AREA.

J. T. BAKER NEUTRASORB(R) OR NEUTRASOL(R) "LOW NA+" ACID NEUTRALIZERS
ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET
TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE APPROPRIATE VENTILATION
CONDITIONS EXIST. IF THE TLV IS EXCEEDED, A SELF-
CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM,
PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE (CORROSIVE)

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA.
KEEP CONTAINERS OUT OF SUN AND AWAY FROM HEAT.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	SULFURIC ACID
HAZARD CLASS	CORROSIVE MATERIAL (LIQUID)
UN/NA	UN1830
LABELS	CORROSIVE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	SULPHURIC ACID
HAZARD CLASS	8
UN/NA	UN1830
LABELS	CORROSIVE

End

APPENDIX A

HEALTH & SAFETY FORMS

Site Safety Briefing
Plan Acceptance
Supervisor's Report of Injury or Illness
OSHA 101
Daily Instrument Calibration
Air Monitoring
Subcontractors Statement of Compliance
Employee Exposure History
Bloodborne Pathogen
Emergency Response Checklist

SITE SAFETY BRIEFINGS

Job Name _____ Number _____

Date _____ Start Time _____ Completed _____

Site Location _____

Type of Work (General) _____

SAFETY ISSUES

Tasks (this shift) _____

Protective Clothing/Equipment _____

Chemical Hazards _____

Physical Hazards _____

Control Methods _____

Special Equipment/Techniques _____

Nearest Phone _____

Hospital Name/Address _____

Special Topics (incidents, actions taken, etc.) _____

ATTENDEES

Print Name	Sign Name
------------	-----------

_____	_____
_____	_____
_____	_____
_____	_____

Meeting conducted by: _____

PLAN ACCEPTANCE

INSTRUCTIONS: This form is to be completed by each Dames & Moore employee to work on the subject project work site and returned to the Office Safety Coordinator prior to site activities.

Project No.: _____

Client/Project: _____

Date: _____

I represent that I have read and understand the contents of the above Plan and agree to perform my work in accordance with it.

Signed _____

Signed _____

Print Name _____

Print Name _____

Date _____

Date _____

Signed _____

Signed _____

Print Name _____

Print Name _____

Date _____

Date _____



DAMES & MOORE

SUPERVISOR'S REPORT OF INJURY OR ILLNESS

To be completed in addition to the "Employer's First Report of Occupation Injury or Illness"

Date/time of incident _____

Project name _____

Job Number _____

CASE NUMBER _____

For office use only

Describe exact location of incident _____

What was employee doing when injured? _____

Describe fully how incident occurred _____

What object or substance directly injured the employee? _____

Who was involved in the incident? (D&M employees)

Name _____

Employee No. _____

Name _____

Employee No. _____

Name _____

Employee No. _____

Any non-D&M employees involved or injured? ☐ No ☐ Yes (if yes, complete next section. Use additional paper if necessary.)

Name _____

Company _____

Name _____

Company _____

Were there any witnesses to the accident? ☐ No ☐ Yes (if yes, complete next section. Use additional paper if necessary.)

Name _____

Employee No. _____

Name _____

Employee No. _____

Who was hospitalized? _____

Who saw a physician? _____

Name of hospital(s) and physician(s) involved? _____

Pending investigation, were any steps taken to prevent reoccurrence? _____

Supervisor's name _____

Signature _____

ADDITIONAL INFORMATION

The Supervisor's Report of Injury or Illness is to be completed by the affected employee's direct supervisor. The supervisor is responsible for obtaining the requested information and making a reasonable effort to complete all sections of the form to the extent possible.

This report is one of a minimum of three that must be completed and/or obtained for distribution. The other reports are the Employer's First Report of Employee Injury or Illness (or equivalent Worker's Compensation form for the particular state) and the Doctor's Report of Occupational Injury or Illness (or equivalent).

Distribution of these forms is as follows:

Rosemary Reisman - EXO (Risk Management)
John Danby - SAC (ASHA Recordkeeping)
Dames & Moore's Worker Compensation Administrator for your state
Employee's file

Bureau of Labor Statistics
Supplementary Record of
Occupational Injuries and Illness

U.S. Department of Labor

This form is required by Public Law 91-586 and must be kept in the establishment for 5 years.
Failure to maintain can result in the issuance of citations and assessment of penalties.

Case or
file No.

Form Approved
O.M.B. No. 1220-0029

Employer

1. Name

2. Mail address (No. and street, city or town, State, and zip code)

3. Location, if different from mail address

Injured or Ill Employee

4. Name (First, middle, last)

Social Security No. | | | | | | | |

5. Home address (No. and street, city or town, State, and zip code)

6. Age

7. Sex (Circle one)

Male

Female

8. Occupation (Enter regular job title, not the specific activity he was performing at time of injury.)

9. Department (Enter name of department in which the injured person is regularly employed, even though he may have been temporarily working in another department at the time of injury)

The Accident or Exposure to Occupational Illness

10. If accident or exposure occurred on employer's premises, give address of plant or establishment in which it occurred. Do not indicate department or division within the plant or establishment. If accident occurred outside employer's premises at an identifiable address, give that address. If it occurred on a public highway or at any other place which cannot be identified by number and street, please provide place references locating the place of injury as accurately as possible.

11. Place of accident or exposure (No. and street, city or town, State, and zip code)

12. Was place of accident or exposure on employer's premises?

Yes

No

13. What was the employee doing when injured? (Be specific. If he was using tools or equipment or handling material, name them and tell what he was doing with them)

14. How did the accident occur? (Describe fully the events which resulted in the injury or occupational illness. Tell what happened and how it happened. Name any objects or substances involved and how they were involved. Give full details on all factors which led or contributed to the accident. (Use separate sheet.)

Occupational Injury or Occupational Illness

15. Describe the injury or illness in detail and indicate the part of the body affected. (E.g., amputation of the right index finger at the second joint; fracture of ribs; lead poisoning; dermatitis of left hand, etc.)

16. Name the object or substance which directly injured the employee. (For example, the machine or thing he struck against or which struck him; the vapor or poison he inhaled or swallowed; the chemical or radiation which irritated his skin; or in cases of strains, hernias, etc., the thing he was lifting, pulling, etc.)

Other

17. Date of injury or initial diagnosis of occupational illness

18. Did employee die? (Circle one) Yes No

19. Name and address of physician

20. If hospitalized, name and address of hospital

Date of Report

Prepared By

Official Position

DAILY INSTRUMENT CALIBRATION CHECK SHEET

Instrument: _____

Serial # _____

[illegible]

AIR MONITORING

GENERAL INFORMATION

Name(s): _____ Background Level: _____

Date: _____ Weather Conditions: _____

Time: _____

Project: _____

Job No.: _____

Estimated Wind Direction: _____

Estimated Wind Speed (i.e., calm, moderate, strong, etc.): _____

Estimated Air Temperature and % Relative Humidity: _____

Location Where Background Level Was Obtained: _____

EQUIPMENT SETTINGS

Range: _____ Alarm Trigger-%LEL: _____

Span Pot: _____ Alarm Trigger-%O2: _____

Calibration Gas: _____ Calibration Gas: _____

FIELD ACTIVITIES

Field Activities Conducted: _____

BACKGROUND LEVEL: _____ LOCATION: _____

Sample No.	Time	Duration (Minutes)	Location	Reading (ppm)	Comments
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

SUBCONTRACTOR STATEMENT OF COMPLIANCE

This document is designed to permit the Dames & Moore Project Manager to evaluate a subcontractor's compliance with the health and safety aspects of the subcontractor agreement. The Project Manager completes the top portion of this document, and provides a copy of the document to each subcontractor who will be participating in project field activities. The subcontractor completes the second portion of the document, signs it, and returns it to the Dames & Moore Project Manager prior to the start of work.

Project Name/Location _____

Job Number _____

Project Manager/Location _____

Subcontractor _____

Tasks _____

Project Dates _____

through _____

SUBCONTRACTOR

Subcontractor certifies that all its personnel assigned to this project have received 40-hour health and safety training per the requirements of 29 CFR 1910.120(e)

Subcontractor Initials

Subcontractor certifies that its field supervisor has completed 8 hours of supervisor training that meets the requirements of 29 CFR 1910.120(e)(4).

Field Supervisor's Name (Print)

Subcontractor Initials

Subcontractor certifies that all of its personnel assigned to this project are participating in a medical surveillance program that meets the requirements of 29 CFR 1910.120(f).

Subcontractor Initials

Subcontractor understands that it is responsible for providing a site-specific health and safety plan for this project that meets the requirements of 29 CFR 1910.120(b).

Subcontractor Initials

Subcontractor initials here if it will provide its own health and safety plan (Dames & Moore will provide OSHA-requested site-specific information).

Subcontractor Initials

OR

Subcontractor initials here if requesting Dames & Moore to prepare health and safety plan for subcontractor's use.

Subcontractor Initials

Subcontractor's Representative (Print)

Signature

EMPLOYEE EXPOSURE HISTORY

Employee Name: _____

Job Name: _____

Job Number: _____

Date(s) From/To: _____

Hours on Site: _____

Contaminants (Suspected/Reported):

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be a standard notebook page, possibly from a composition book. The edges of the paper are slightly irregular, suggesting it might be a scan of a physical document. There is no handwriting or other markings on the page.

(See Attached Laboratory Analysis)

BLOODBORNE PATHOGENS INCIDENT EVALUATION REPORT

Employee Name: _____

Office/Location: _____

Incident Date: _____ Incident Time: _____ a.m./p.m.

Did the employee render First Aid or CPR with blood or other potentially infectious materials present: ☐

Did an exposure incident occur? ☐ If yes, describe here and complete the following section.

Circumstances: Supervisor's assessment of the following control measures used at the time of the exposure (see definitions below):

Route of Exposure: _____

Engineering: _____

Work Practice: _____

Personal Protective Equipment: _____

Reason for failures of the control measures or failure to comply with recommended protective measures:

Measure taken to minimize the reoccurrence of exposure incident: _____

Supervisor's Signature: _____

Definitions:

Exposure Incident means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

Engineering Control means controls (e.g., sharps, disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.

Work Practice Controls means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique.)

Personal Protective Equipment is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes not intended to function as protection against a hazard are *not* considered to be personal protective equipment.

Routing Requirements: Medical Surveillance Program Manager - DEN
Division Health and Safety Manager

EMERGENCY RESPONSE CHECKLIST

In an Emergency	Yes	No
Confirm the reported incident	<input type="checkbox"/>	<input type="checkbox"/>
Evacuate and secure the area	<input type="checkbox"/>	<input type="checkbox"/>
Render first aid/emergency medical care	<input type="checkbox"/>	<input type="checkbox"/>
Notify promptly:		
Project Manager	<input type="checkbox"/>	<input type="checkbox"/>
Fire Department	<input type="checkbox"/>	<input type="checkbox"/>
Police Department	<input type="checkbox"/>	<input type="checkbox"/>
Nearest Hospital or Medical Care Facility	<input type="checkbox"/>	<input type="checkbox"/>
Start Documentation	<input type="checkbox"/>	<input type="checkbox"/>
If a spill or leak occurs:		
Don the proper PPE	<input type="checkbox"/>	<input type="checkbox"/>
Stop the source	<input type="checkbox"/>	<input type="checkbox"/>
Contain the spill	<input type="checkbox"/>	<input type="checkbox"/>
Clean up the spill	<input type="checkbox"/>	<input type="checkbox"/>
Upon evacuating, take attendance at the assembly area	<input type="checkbox"/>	<input type="checkbox"/>
Authority given:		
Leave the site	<input type="checkbox"/>	<input type="checkbox"/>
Restart the operations	<input type="checkbox"/>	<input type="checkbox"/>
Debrief and document the incident	<input type="checkbox"/>	<input type="checkbox"/>
A copy of the document submitted to the DHSM	<input type="checkbox"/>	<input type="checkbox"/>